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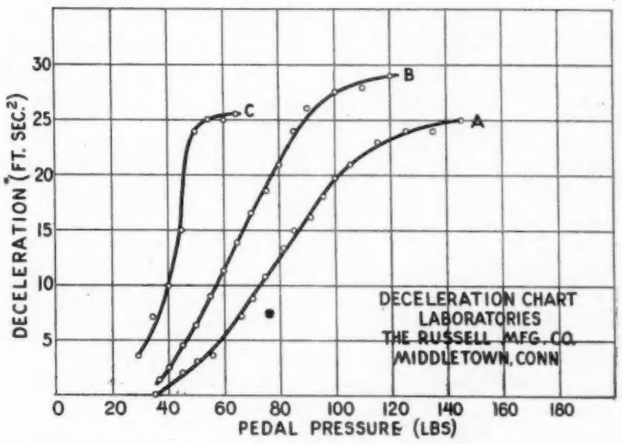

Data: Weight of car, 4,765 lbs. Drum size, 15". Drum material, steel. Curves taken after 1800 test stops. Tire size, 6.50x19. All stops from 20 m.p.h. Weather, dry; road, cement—all tests. Brakes fully adjusted and equalized and drums in perfect condition before all tests. Name of car on request.

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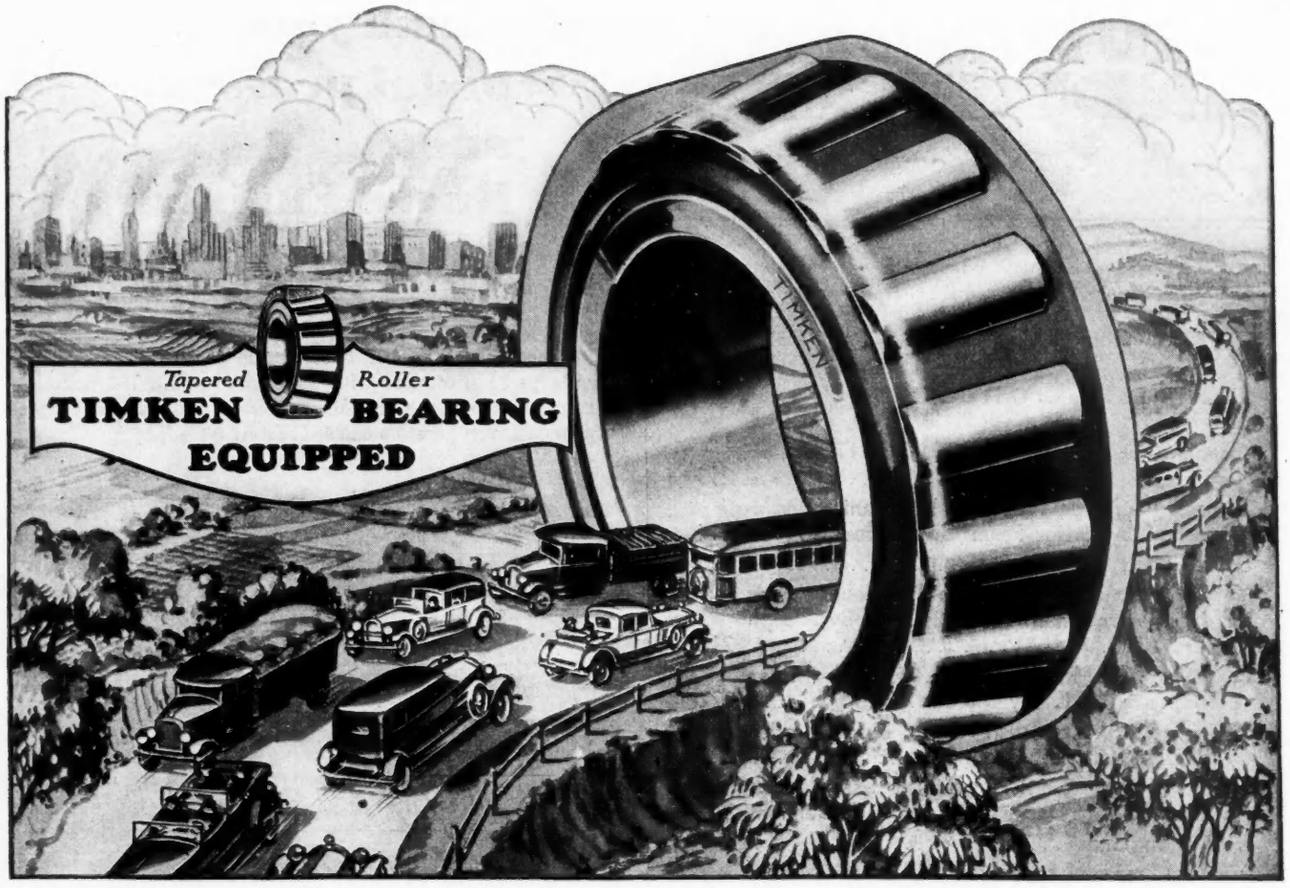

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AUTOMOTIVE INDUSTRIES
VOLUME 66 FEBRUARY 13, 1932 NUMBER 7

Graham Assists Dealers With 2 Fiscal Programs

Participation by factory in payment of new salesmen engaged on trial and provision of a copyrighted idea for used-car selling are bases of broad merchandising effort

Any Graham dealer may take two new salesmen for a trial period of 3 weeks, during which the factory contributes $25 to a drawing account and the dealer a like amount. If the trial salesman sells one car during the period he is retained, his association under the plan continuing so long as he can sell cars at the rate of one in three weeks. If he cannot make this figure, he is replaced by a new salesman operating on the same terms.

Used car selling is clarified for Graham dealers under the Scholk plan, rights to which have been obtained for its dealers by the factory. The fundamentals of this plan, which gives the salesman a real interest in the used car he is trying to move, are explained in this article.

DIRECT factory aid in retail salesmen compensation and a retail sales plan eliminating the used car "problem" and providing more earning power for the salesman are the basic ideas on which have been developed two plans being made available by the Graham-Paige Motors Corp. to its dealer organization.

The first of these two plans, dealing with factory assistance in salesmen compensation and briefly mentioned in *Automotive Industries* last August, was at that time the first official step taken by an automobile manufacturer in this direction.

Under this plan the factory pays the dealer $25 per week for every two new salesmen put on for a trial period of three weeks. The dealer in turn contributes another $25, establishing a drawing account thereby for each new salesman of $25 per week. Following the trial period, if the salesman has sold no cars, his drawing account is automatically terminated and the dealer receives no further credit on this particular salesman. However, the dealer has an opportunity of taking on a new group of salesmen for a further trial period of three weeks until satisfactory men have been secured.

If during the trial period the salesman has sold one car, he is entitled to a continuation of the drawing account, half of which is obtained from the factory and half from the dealer himself, for as long as he is able to sell one car per week. If the salesman is not able to keep up to this quota but has shown himself to be of high calibre, the dealer has the opportunity to make his own arrangements with the salesman in question. Approximately 20 per cent of the Graham-Paige dealers to date have taken advantage of this plan, and new salesmen to a number approximating 40 per cent of the total before the plan was put into effect have gone through the probationary period since the inception of the plan.

The factory estimates that approximately 50 per cent of these new men have been retained in one form or another by the dealer, indicating considerable improvement in the sales staffs of the dealers who have worked under this plan.

To avoid abuses, the salesmen's applications must be approved by the district manager or field man, and the salesman must not have been with the dealer's or-

ganization at any time during the 90 days previous to his application.

It is not the purpose of Graham-Paige Motors Corp. to actually subsidize dealers by offering additional salesmen compensation for an indefinite period as will be noted, but rather to make it possible for the dealer at a minimum of cost to himself to acquire a stronger retail staff.

This plan works in well with the retail sales plan offered its dealers by Graham-Paige. The basis of this plan, developed and copyrighted by A. M. Scholk, is the consideration that a new car sale is not completed until the used cars involved in the trade-in have been sold. The plan attempts to do two things for the salesman:

1. It presents an opportunity to the better salesman to make more money than he normally could earn.
2. At the same time it lifts the salesman to a position of responsibility and opportunity by virtually making him a partner without investment of capital in the dealership.

The plan is intended to do four things for the dealer:

1. It is intended to reduce his total direct sales costs.
2. It is designed to attract and hold the most desirable salesmen.
3. It provides a direct control over used car inventories.
4. It tends to insure the disposition of a satisfactory volume of new cars every month *at a profit.*

Under this plan a good salesman is defined as one who is not only a *new car salesman* to the public but also a *used car buyer* for the dealer and a *used car salesman* to the public. His volume of profit is directly dependent upon his own efforts in that it varies with his ability to buy the used car right and also to sell it, or see that it is sold, right.

Under this plan a salesman receives 10 per cent commission on new car, used car and accessories sales, and one-half of any profit made on a used car sale above trade-in and reconditioning cost. To earn this commission, however, the car must be sold in a definitely limited period either by himself or by some other salesman. If sold by another salesman at a profit, this latter salesman's 10 per cent commission is deducted of course from the profit share accruing to the new car salesman. If the used car remains in stock over the stipulated period an inventory cost is added to provide a commission for the salesman selling this car. In any case, however, no commission is paid to the new car salesman until the used car has been sold and the dealer's capital and profit also converted into cash.

It will be seen that the plan provides the salesman with the following incentives:

1. He tries to buy the used cars right, as his total profit on a new car sale will depend upon the sale price and profit, if any, of the used car.
2. He will attempt to sell the used car immediately in order to avoid the inventory charge and also to insure his early collection of his commission.
3. It will make him a better salesman for the new car as his selling success will not depend entirely upon how much he can get the dealer to allow the customer on the customer's old car.

This plan was developed by Mr. Scholk as a dealer on the Pacific coast and used by him with considerable success, following which it was sold to other dealers with similar results. Mr. Scholk recently sold his dealership and has been concentrating on the promotion of his plan, the first company to adopt it being the Graham-Paige Motors Corp. An analysis of the plan indicates that it admirably fits present conditions in the retail sales field in that it is predicated upon elimination of the used car as a problem to the dealer, and does make possible a higher earning power to attract the better class of salesmen to the automotive retail field. It should help the dealer, for instance, by making it unnecessary for him to retain, except in the case of the very largest dealerships, a sales manager or used car appraiser.

As a means of improving salesmanship, Graham-Paige believes that it has decided advantages over the sole use of educational material as represented by the usual factory literature and field lectures, in that the Scholk plan virtually forces the salesman to "think." Graham-Paige believes that for maximum effectiveness the desire and the necessity for merchandising education must arise from the salesman himself, and not be thrust upon him. In this direction the plan, it is believed, should go far in accomplishing improved retail selling.

Discussion of Free-Wheeling Lubricants Supplemented by Letter From Committees

Editor, AUTOMOTIVE INDUSTRIES:

In the Jan. 30 issue of *Automotive Industries,* there is an article entitled "S.A.E. STANDARDS COMMITTEE BALKS AT FREE-WHEEL OILS." In the last column on page 155, there is a paragraph on free-wheeling lubricants. This title and this paragraph tend to give the public a very erroneous idea in regard to the free-wheeling lubricants situation. It may be that we are partially to blame for the misunderstanding and confusion that your article will produce, since we have not taken the trouble to supply you with the correct information.

The situation as given in the article in your magazine is substantially correct as of the latter part of last year, but it fails to take into account the later developments. A joint meeting of the A.S.T.M. and S.A.E. Lubricants Committees was held in New York, Nov. 23, 1931. The majority and minority reports to which reference is made in your magazine were issued along with the minutes of that meeting.

In the latter part of December, 1931, representatives of both the majority and minority group got together to adjust the differences of opinion. The free-wheeling lubricants specifications which were originally adopted by the free-wheeling lubricants committee of the automobile manufacturers in May, 1931, were recognized by both the oil and automobile industries as being correct in principle but with certain objections from a commercial standpoint. The

(Turn to page 230, please)

Just Among Ourselves

Full Streamlines—Probably Rear Engines

THE fully streamlined automobile is coming—and probably the rear-engined car, too. Opinions differ on just how quickly. We think it will be within two years at the outside. By that we mean that the whole American industry will have moved very far in that direction within two years.

The movement probably will come like most other major swings in automobile design have come in the past. Some big, important manufacturer will take a very long step in that direction. He will meet with some measure of success. Then everybody else will start running the same way. Then, rather suddenly, present-day models will be obsoleted.

Should the new Graham model be preeminently successful this year, we believe that the speed with which rear-engined and fully streamlined cars come on the market will be accelerated by many months.

Burney's Talk Pops the Question

THERE isn't an important passenger car company in the industry today which isn't studying the rear-engined, streamlined design possibilities very carefully. The visit of Sir Dennistoun Burney to this country and his talk before the S.A.E. in Detroit recently have given further impetus to an already aroused trade interest.

Several American designs, some of them outside the factory engineering departments, have already been worked out in great detail and offer a beauty of line and simplicity of mechanism far beyond anything on the streets today.

The One-Jump vs. the Nibble Theory

THE only real question now, we believe, lies between those who think the transition to fully streamlined cars should be made in several steps or whether most of the route should be traveled in one jump.

As stated a few weeks ago, we have moved from the camp of those who favor gradual modification over to that of the group which thinks greater commercial success lies closer to the one-big-jump idea.

Obviously great care will have to be taken in making that one big jump. Some of the fully streamlined cars already on public view abroad would almost certainly be commercial failures on the American market. But we are convinced, on the basis of designs which we already have seen, that a streamlined car—far different from anything in production today—can be built which not only would be accepted by the American public, but which would definitely attract more than enough people to make it commercially successful.

True, any design of this kind when first announced will meet with severe criticism and the disfavor of many. That is to be expected. But the gamble of its producer at that time will be that enough people actively will like it well enough to buy it.

Successes—and failures it must be admitted — have been developed on that basis in the past. The original Auburn body design developed under E. L. Cord's regime brought definite reaction from almost everybody who saw it. Some disliked it violently. Others liked it. But hardly anybody was indifferent. Bids for success on this same basis are being made by several passenger car makers today. And their chances of success certainly seem to us to be far greater than for those who everlastingly steer the middle course, trying to please everybody, getting little adverse comment and yet not exciting a definitely favorable reaction in the minds of enough people to make it possible to reach the heights of commercial success.

Again in 1932, as in 1931, many car and truck builders are going to find themselves faced with the question—"Can we afford not to make some fairly radical move?"

Changes that Click Don't Cost Anything

COST, obviously, is one big factor which makes manufacturers hesitate to take radical steps, especially in body design. Body dies are expensive. There's always a good mechanical cost reason for trying to use some of last year's body dies in next year's car.

But when all is said and done, there is much of truth in the paradox which Kettering stated at an Oakland zone dealer meeting in Detroit recently when he said that it costs nothing to make changes in an automobile. His explanation was that if you lose more money by not changing the car than you do by changing it, the change doesn't cost you anything.

And at that same meeting he said that five years from now there wouldn't be a thing on the automobile that is "modern" today.—N.G.S.

Vapor Lock, 1931's Phantom Headache,

"Pooh-pooh!" said the engineers. "Of course our cars don't have it." But this survey shows that time has been spent effectively on trouble which was denied by the factories

VAPOR LOCK—that bugaboo of car owners, service men and refiners—seems to be passing out of the picture so far as many of the 1932 cars are concerned. At least that is the evidence we have found in analyzing the fuel systems of 27 1932 car models at the New York and Philadelphia Automobile shows.

Some engineers have gone to great lengths in designing to free fuel systems from vapor lock, much further, in fact, than one would have had the temerity to suggest 'way back early in 1931. The most encouraging evidence that engineers have tackled in a thorough manner is that information concerning vapor lock has permeated to the dealer salesman. On several occasions as we crawled on the floor to trace the course of a gas line, the salesman would say "Yes, we're putting the gas lines outside of the frame now so as to cool it."

In presenting this analysis as a follow-up on the study begun last year* there is no attempt to be prophetic.

As a matter of fact, it would be difficult for anyone to examine a fuel line and say with any degree of certainty that it will or will not vapor lock.

However, there are certain principles of good design and others that are obviously poor. Naturally, the final check on the result of this year's efforts will be found in the performance of 1932 automobiles this coming spring.

In the previous article, we made the following four recommendations concerning the controllable factors in the fuel line.

1. Favorable location of fuel lines.
2. Favorable location of the fuel pumps.
3. Desirability of cooling the carburetor.
4. Necessity for venting under-the-hood atmosphere.

A bird's-eye view of how these critical elements and other important details have been taken care of is given in Table 1, where the relation between carburetor, fuel pump and exhaust manifold, and the general disposition of the fuel lines can be readily seen.

The new Buick layout shown in phantom view in Fig. 1, illustrates a number of design features which characterize other makes. For example, the outstanding practice today is to run the fuel line from the main tank along the outside of the chassis frame, thus bringing it right out into the air stream under the car and away from the radiated or convected heat of the exhaust lines. Of the 27 models examined, 13 chassis or 48 per cent now carry the fuel lines out-

*"Designers Must Cool Hot Spots in Fuel Lines" by Joseph Geschelin, *Automotive Industries*, May 23, 1931.

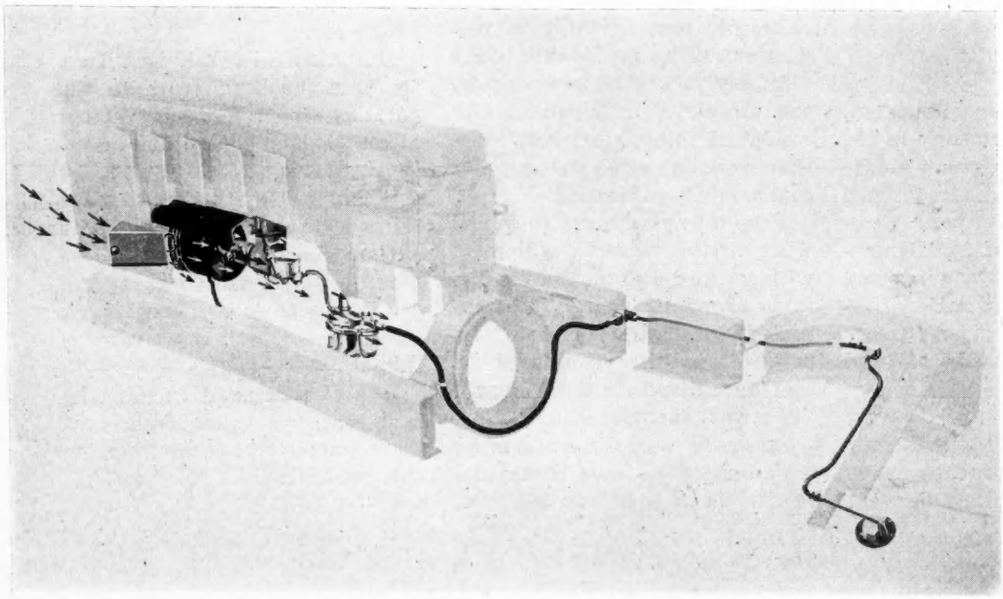


Fig. 1—Phantom view of Buick fuel system. Main line outside of frame; frame to pump, insulated. Note air scoop for cooling carburetor

Gets Tangible Treatment on 1932 Cars

by Joseph Geschelin

side the frame. As an additional precaution, one of these insulates the line.

Five makes run the fuel line inside the frame but on the side opposite to the exhaust line. Two of those who still persist in carrying the fuel lines on the same side as the exhaust lines and inside the frame, insulate the gas line by a circular loom.

The real importance of the favorable disposition of the main fuel line may be judged from the fact that a rise in temperature up to 36 deg. Fahr. was reported on some cars last year. Details of the Bureau of Standards tests in this connection, will be found in the early article.

Where the fuel line is carried outside the frame, a new design element enters in, namely the connection between the frame and the fuel pump. On cars which have the pump mounted close to the frame, a flexible rubber gas line is used between the pump and the frame connection, thus eliminating bends in the metal line and at the same time providing an essential degree of flexibility, particularly on floating power jobs. Hence, this rubber connection must resist the chemical action of gasoline as well as fatigue due to heat and severe bending. Perhaps it might be a good idea to look into some of the newer rubber products, which are said to fulfill these requirements to the letter.

In a number of cases, particularly where downdraft carburetors are used, it has been possible to break up the fuel lines into two distinct sections, that is, fuel tank-to-pump and pump-to-carburetor. The

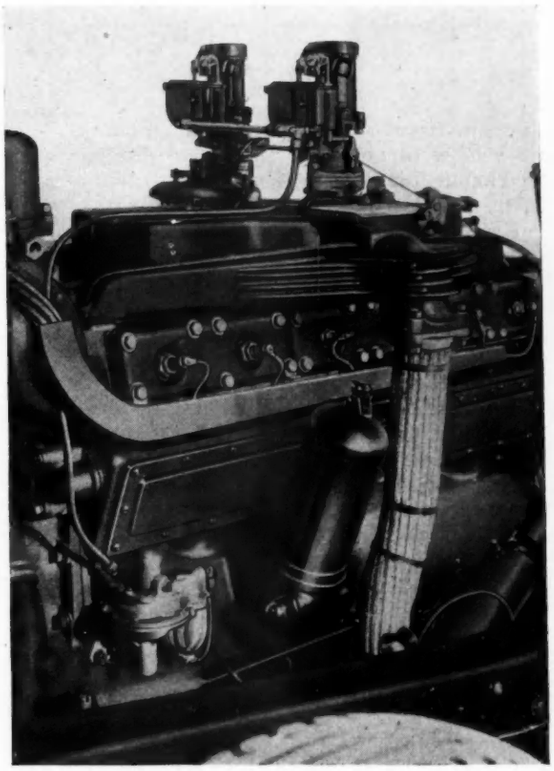


Fig. 2—Auburn 12 is a good example of current practice with fuel line to carburetors in air stream. Heat shields below the carburetor deflect heat from exhaust manifolds

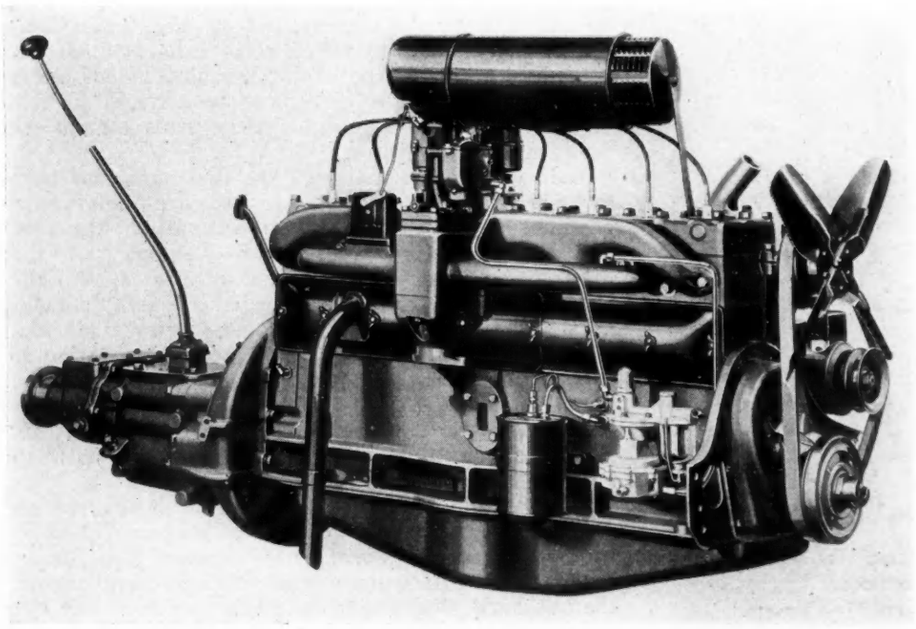


Fig. 3 — Pump mounting and fuel line on Oldsmobile 8. The main fuel line runs on opposite side and comes over to the pump around front end

Table I

Analysis of fuel lines of 27 new car models

Car Model	Exhaust Manifold Location	Carburetor Type
Auburn 12	Right & left center	Two downdraft
Buick	Left, front	Std.
Cadillac V12	Right & left, rear	2, Std.
Chevrolet	Left, center	Downdraft
Chrysler Imperial	Right, center	Downdraft
Dodge 4 Commercial	Right, front	Std.
Dodge 6	Right, rear	Std.
Dodge 8	Right, center	Downdraft
Essex	Right, rear	Std.
Graham	Left, front	Std.
Hudson	Right, rear	Std.
Hupmobile 8	Right, rear	Std.
Lincoln V8	Left, front	Downdraft
Marmon 8	Right, front	
Marmon 16	Left, front	Downdraft
Nash 8	Left, center	Std.
Oldsmobile 8	Right, center	Downdraft
Packard 8	Right, rear	Std.
Packard Twin-6	Right, rear	Downdraft
Plymouth	Right, front	Std.
Pontiac 6	Right, rear	Std.
Pontiac V8	Left, center	Downdraft
Reo 8	Right, front	Std.
Rockne 65	Right, rear	Std.
Rockne 75	Right, front	Std.
Studebaker Pres. 8	Right, front	Std.
Stutz	Right	

downdraft carburetor particularly, permits of a rather long line from pump to carburetor which is readily drawn in front of the engine and exposed for its entire length to the full fan blast. This construction is found on at least 10 of the 27 cars. On the Buick, where the carburetor and pump are close-coupled, protection is offered by insulating the cross-over of the fuel line from the right to the left side of the car. Oldsmobile, which has the fuel line inside the frame but opposite to the exhaust line, achieves a considerable cooling effect by running the gas line around the front end of the engine in the cross-over from the frame to the pump.

Hudson and Essex still adheres to the use of the vacuum tank, a practice which is unique so far as current design goes. The vacuum tank is located on the dash on the left-hand side, opposite the exhaust manifold. The fuel line from the tank to the carburetor is well insulated in crossing over from left to right.

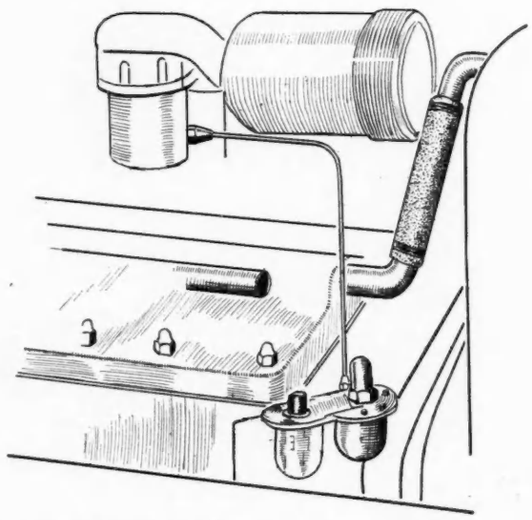


Fig. 4—On the Lincoln, the pump is mounted at the front end above the motor leg. It is well in the air stream

The new Auburn 12, Fig. 2, is a good example of contemporary fuel line design. Both downdraft carburetors are fed from a single pump with the vertical and horizontal branches of the fuel pipe well in the air stream. Note particularly the use of sheet metal shields at the top of the manifold which serve to deflect heat from the carburetor. Fig. 2 also illustrates the manner in which some exhaust lines are lagged to minimize the effect of radiated heat under the hood. Oldsmobile 8, Fig. 3, shows a typical method of running the fuel line in the air stream from the pump to the carburetor.

Evidentally the location of the fuel pump has been given considerable thought, for there are a number of cases of really advantageous positioning. On four makes the pump is located on the side opposite to the exhaust manifold. On the Lincoln, Fig. 4, and the Packard Twin Six, Fig. 5, the pump is located right at the timing gear case above all obstructions and directly in the fan blast. An interesting variation of this is found on the Pontiac V-8, Fig. 6, where the pump is located at the top center of the engine directly above the flywheel housing. Obviously in this position it gets the benefit of the air stream between the two banks of cylinders.

Considerable ingenuity is evident on designs which did not lend themselves to a radical rearrangement of engine accessories. Consider the Graham Blue Streak for example; both exhaust manifold and pump are on the left hand side, fairly close together and with the

Carburetor Location	Insulator Gasket	Fuel Pump Location	Fuel Line—Pump to Carburetor	Main Fuel Line—Tank to Pump
Right & left, center	About 3/16 in.	Front, left	Up in front, in air stream	Left, in frame, insulated
Left, center		Rear, left		Right, outside frame cross over to pump insulated
Right & left, center		Front, left	Front, in air stream	Left, outside frame
Left, center		Front, right	Front, right to left	Inside frame on right
Right, center	About ½ in.	Front, right	Front, in air stream	Right, outside frame
Right, center		Front, right		Right, inside frame
Right, center		Front, right		Right, inside frame
Right, center		Front, right		Right, outside frame
Right		*Vacuum tank on left	Rear, left to right insulated	Left, outside frame
Left	About ¼ in.	Front, left		Left, outside frame insulated
Right		*Vacuum tank on left	Rear, left to right insulated	Left, outside frame
Right		Front, right		Right, inside frame
Center		Front, right	Up to Carb. in air stream	Right, inside frame
Right		Front, right		Right, inside frame
Center		Center, left	Up to Carb. in air stream	
Left, Center		Front, right	Right to left, front	Right, inside frame
Right, center	About ½ in.	Front, right	In air stream	Left, in frame, around front to pump
Right, center		Front, right		Right, outside frame
Center	About ½ in.	Front, right	In air stream	Right, outside frame
Right, center		Front, right		Right, outside frame
Right		Front, right		Right, outside frame
Center		Over flywheel	In air stream	Right, outside frame
Right		Rear, right		Right, inside, insulated
Right		Rear, right		Through X-frame
Right		Front, right		Right, outside frame
Right		Rear, right		Right, inside frame
Left		Top, left		Left, inside frame

exhaust manifold in front of the pump. As shown in Fig. 7, the exhaust manifold is run in front of the motor leg so that the leg now serves as a heat shield in front of the pump. On the Plymouth, which has both the pump and exhaust manifold inside the motor leg, a vertical sheet metal shield is interposed as shown in Fig. 8. On the Dodge 8, a similar device is employed except that here the heat shield is horizontal, because the pump is placed directly under the manifold system.

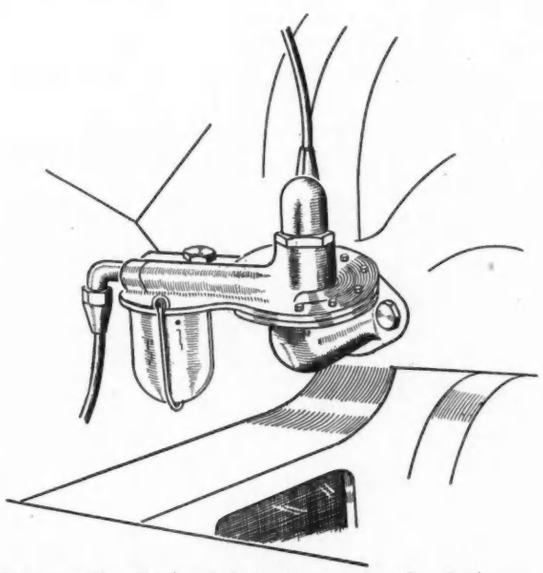


Fig. 5—The Packard twin-six mounts the fuel pump at the front directly in the air stream

Nash, Auburn, Hupmobile and several others insulate the exhaust manifold extension and piping with a heavy lagging for its entire length under the hood. This not only aids in holding down the under-the-hood temperature but should materially decrease the temperature in the cowl compartment. On the Studebaker President 8, a huge carburetor silencer lying directly under the carburetor and pump seems to serve as a pretty effective shield between these units and the exhaust manifold which runs directly under the drip pan.

Coming to the carburetor mounting, one extremely important feature, although it has been pooh-poohed before, is that of adequate insulation between the carburetor and the intake manifold flange on which it is mounted. A number of engineers have recognized this point by interposing a fiber or composition spacer between carburetor and manifold. An asbestos, cork, or vellumoid gasket is used at the top and bottom of this spacer in the usual fashion to provide flexibility and the requisite tightness. The overall thickness of the insulation on five or six makes varies from 3/16 to ½ in. Chevrolet uses a metal cross adaptor at this point which through the medium of two gaskets probably accomplishes the same purpose.

Some basic changes have been made in carburetor construction to further inhibit the effects of vapor

Rx

1. The fuel line from the main tank to the pump should be carried on the side opposite the exhaust line. It may be carried either inside or outside the frame. If inside, it should be well insulated.

2. The fuel pump should be mounted as far away from the exhaust manifold as possible, preferably on the opposite side. Moreover, it should be placed directly in the open air stream.

3. The fuel line from the pump to the carburetor should be carried around the front end in the air stream. If carried around the rear end and in the proximity of exhaust lines, it should be well insulated.

4. The carburetor should be provided with adequate ventilation to prevent boiling in the float chamber. Wherever possible it is wise to insulate the carburetor flange from the manifold flange by means of spacer perhaps 1/2 inch thick.

5. Although under-the-hood ventilation was mentioned in our previous study there is little evidence that anything has been done about it on current designs. The growing use of hood doors is certainly helpful provided that these are kept open, but there seems to be room for some fixed outlet which will reduce pressure under the hood and provide free egress for gases and heated air.

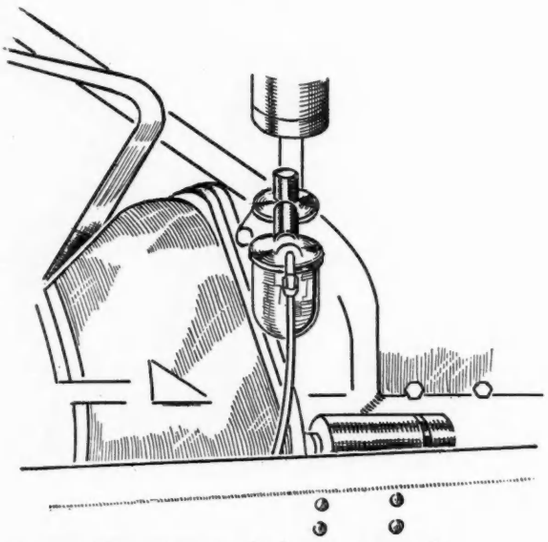


Fig. 6—Mounting the fuel pump over the flywheel housing is a unique feature of the Pontiac V8

lock. For example, on the Buick jets have been extended further into the float chamber so as to get into the liquid level. In addition, the Buick design incorporates an air scoop extending through the hood to provide positive cooling at atmospheric temperatures.

On the Packard Twin Six the carburetor has been provided with vertical jets projecting well into the liquid levels. Packard Eight, on the other hand, incorporates a very ingenious device consisting of a vacuum line from the top of the float chamber into the manifold. In effect this will break vapor locking by sucking vapors as they are formed.

In general, downdraft carburetors show up to great advantage, as they are located at the highest point on the engine directly in the air stream. This is particularly effective on contemporary models because of the generally higher level of the fan.

Casual inspection indicates that there are still a number of places where improvement might well be made to safeguard performance. This statement must be qualified, of course, since it is quite possible that the cars we have in mind may not show any tendency toward vapor lock under actual operating

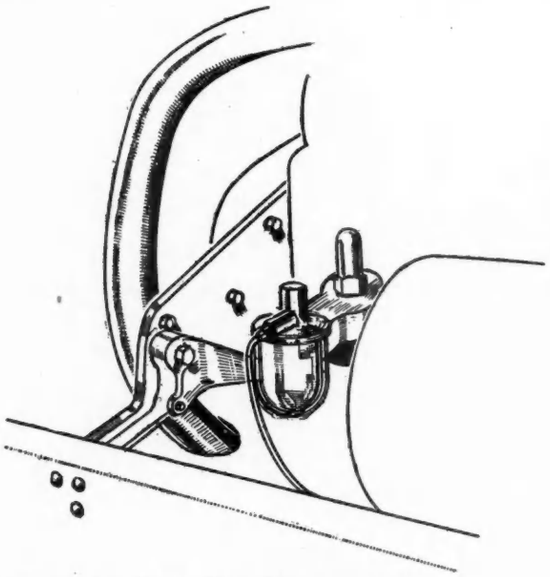


Fig. 7—On the Graham Blue Streak, the exhaust is in front of the fuel pump. The motor leg is utilized as a heat shield

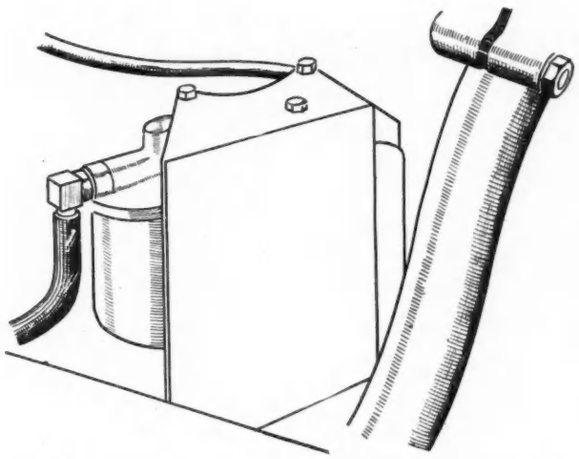


Fig. 8—Plymouth uses an auxiliary shield between the pump and exhaust manifold

conditions. But if they do, the engineer will know exactly where to look for the trouble.

For instance, there are still a few pumps which are directly in the blast of the exhaust pipe or located directly behind a motor leg which is not cut away for ventilation. Yet, we know that the pump location is extremely critical because Bridgeman's tests last year showed a temperature rise of 20 to 28 deg. F. through the pump. On the other hand, it is possible that well-cooled fuel lines ahead of the pump and between the pump and carburetor may reduce the general temperature level to a safe value.

Seemingly neglectful of all that has been said and done, some fuel lines are still run inside the frame along the exhaust line. If nothing else can be done, at least these lines could be carried within a loom, so as to provide some degree of insulation.

In the main, engineers have made remarkable progress in overcoming the vapor-locking tendencies in the fuel lines. Many have gone far beyond the recommendations of investigators in this field. It seems quite logical at this point to set down a few of the principles which are confirmed by current practice. The following list takes in just the critical elements and is necessarily quite general in scope.

1. The fuel line from the main tank to the pump should be carried on the side opposite the exhaust line. It may be carried either inside or outside the frame. If inside, it should be well insulated.

2. The fuel pump should be mounted as far away from the exhaust manifold as possible, preferably on the opposite side. Moreover, it should be placed directly in the open air stream.

3. The fuel line from the pump to the carburetor should be carried around the front end in the air stream. If carried around the rear end and in the proximity of exhaust lines, it should be well insulated.

4. The carburetor should be provided with adequate ventilation to prevent boiling in the float chamber. Wherever possible it is wise to insulate the carburetor flange from the manifold flange by means of spacer perhaps ½ in. thick.

5. Although under-the-hood ventilation was mentioned in our previous study there is little evidence that anything has been done about it on current designs. The growing use of hood doors is certainly helpful provided that these are kept open, but there seems to be room for some fixed outlet which will reduce pressure under the hood and provide free egress for gases and heated air.

The market now affords two vapor "unlock" devices which are attachments intended for mounting directly at the carburetor. By the looks of it, these devices may not be necessary on the 1932 cars. But if they have the merit claimed for them by their makers, they can certainly serve a very useful purpose on the cars now in service.

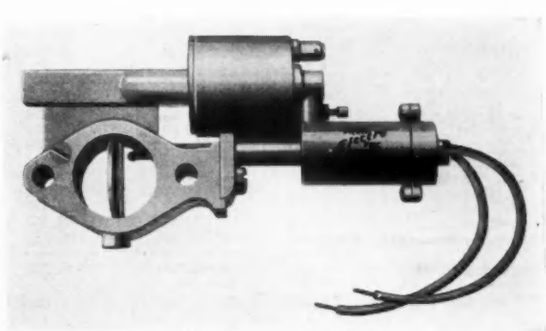
In closing we may say that after the fuel lines of the 1932 cars run the gauntlet of spring driving conditions, they will be greeted with a loud chorus of joy by car owners and petroleum technologists.

Pierce Designs Electro-Vac Engine Governor

IN selling its centrifugal governors to the trade for installation on commercial vehicle engines, the Pierce Governor Co. of Anderson, Ind., was handicapped by the fact that many of the lighter trucks are equipped with passenger-car engines which have no provision for the installation of a speed governor. To overcome this, the company has developed a new type of governor known as the Electro-Vac, of which an illustration is shown herewith. It is based upon a combination of the principles of centrifugal force, electromagnetic action and pneumatic pressure.

In installing the governor on a truck engine, the rotor is removed from the ignition unit and a very small centrifugal unit is mounted on the end of its shaft. The distributor rotor is then replaced on top of the centrifugal unit. The centrifugal unit carries an adjusting screw by means of which the spring tension of the unit can be varied and thus the speed at which the governor controls the engine adjusted, after which the mechanism can be sealed. When the engine reaches the predetermined speed the centrifugal unit closes an electric circuit, thus causing an electro-magnet to function. This electro-magnet, which is built into the governor, opens a by-pass and allows the intake-manifold vacuum to operate on a piston which closes the butterfly valve in the governor valve box.

The advantage of using the inlet-manifold vacuum to operate the governor throttle is said to be that the valve can be cushioned by means of the air cylinder, allowing the throttle to travel through its entire range in accordance with the curve of engine acceleration.



Passenger Car Registrations Per Dealer Rose Sharply in 1931

Reflecting the fact that while registrations in that category fell only 1.8 per cent, the estimated decrease in dealers reached 10 per cent

by Marcus Ainsworth

PASSENGER car registrations per passenger car dealer range in 1931 from 376 in the West North Central zone to 820 in the Pacific zone, with an average for the country of 520 cars per passenger car dealer. This is a decided increase in the same data as recorded for 1930, and is due to the fact that whereas passenger car registrations have decreased only 1.8 per cent, the number of car dealers has decreased 10 per cent.

Fifteen states of the Union will show an increase in total motor vehicle registration in 1931. Ten of these states—Connecticut, District of Columbia, Maine, Maryland, New York, New Hampshire, New Jersey, Pennsylvania, Rhode Island and Virginia— are all on the Eastern seaboard, forming the largest industrial sector of the country.

The remaining five—California, Nevada, Ohio, Oregon and Wyoming—are scattered, but none of the states showing increases are strictly agricultural sections.

Studying the motor vehicle registrations by the various zones, we note that Zone 2, comprised of New Jersey, New York and Pennsylvania, shows an increase in motor vehicle registrations of 0.5 of 1 per cent, while the Pacific zone 9, consisting of Washington, Oregon and California, is on a par with the registrations of 1930. The remaining zones indicate a loss varying from 0.5 of 1 per cent to 4.2 per cent. Zones 1, 2 and 9 show a greater percentage of total registrations in 1931 than they did in 1930, accounting for 36.10 per cent of total vehicles registered in the country, while in 1930 they only accounted for 35.45 per cent of total registrations.

The accompanying chart showing per cent of total sales by months indicates a larger percentage of cars sold during the first half of 1931 than might be expected. The normal line represents the average monthly sales for the six years from 1925 to 1930 inclusive. It is shown in the form of per cent of total sales a month.

During the first six months of normal sales, 55.39 per cent of the passenger cars were sold, while in 1931 this percentage jumps up to 61.4, a gain of about 10 per cent. Prior to 1931, when the National Automobile Chamber of Commerce established its "show time" announcement policy, there were new model announcements throughout the late summer months, which probably caused a more even distribution of sales through the year. This practice was discontinued in 1931, with the resulting sharp decline in sales during the latter part of the year, since there were no new announcements to stimulate public interest.

Again, taking the zone marketing areas, it is noted that a greater percentage of total of new passenger car registrations occurred in the New England States, New Jersey, New York, Pennsylvania, and the South Atlantic States during 1931 than for 1930. These three zones accounted for 43.98 per cent of the total, while in 1930 they represented only 38.47 of the total sales.

The Middle Atlantic States of New Jersey, New York and Pennsylvania represented 24.47 per cent of the United States in sales. Ohio, Indiana, Illinois, Michigan and Wisconsin came second, accounting for 22.31 per cent of sales, and the rest of the zones varying from 11.72 per cent to 2.83 per cent in the Mountain States of Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah and Nevada.

ZONES	Passenger Car Registrations to Dec. 31, 1931	Passenger Car Registrations to Dec. 31, 1930	New Passenger Car Sales by Zones, 1931*	New Passenger Car Sales by Zones, 1930*	Per Cent New Passenger Car Sales by Zones, 1931	Per Cent New Passenger Car Sales by Zones, 1930	Ratio of Cars Scrapped or Unregistered in 1931 to New Car Sales in 1931	Number of Passenger Car Dealers, Dec. 31, 1931	Per Cent Car Dealers by Zones	New Car Sales Per Passenger Car Dealer, 1931	Passenger Car Registrations Per Passenger Car Dealer
1. New England ...	1,469,938	1,477,227	173,558	205,982	8.78	7.58	104	2,838	6.50	61	521
2. Middle Atlantic .	4,188,023	4,160,503	483,706	583,280	24.47	21.40	94	8,025	18.36	60	522
3. South Atlantic...	2,136,450	2,205,979	211,908	257,721	10.73	9.49	133	3,858	8.83	55	554
4. E. N. Central....	5,431,470	5,563,591	440,613	623,258	22.31	22.95	130	10,320	23.60	43	527
5. W. N. Central....	3,118,041	3,214,743	231,830	359,666	11.72	13.25	142	8,280	18.95	28	376
6. E. S. Central.....	1,029,300	1,068,012	78,083	122,634	3.94	4.52	150	1,991	4.56	39	518
7. W. S. Central....	1,991,439	2,063,970	125.327	226,282	6.33	8.32	158	3.174	7.25	39	628
8. Mountain	798,039	832,284	56,142	86,175	2.83	3.17	161	2,076	4.75	27	385
9. Pacific	2,576,746	2,596,935	175,533	252,890	8.89	9.33	111	3,146	7.20	56	820
United States ..	22,739,446	23,183,241	1,976,700	2,717,888	100.00	100.00	173	43,708	100.00	45	520

* New-car registrations plus 3½%.

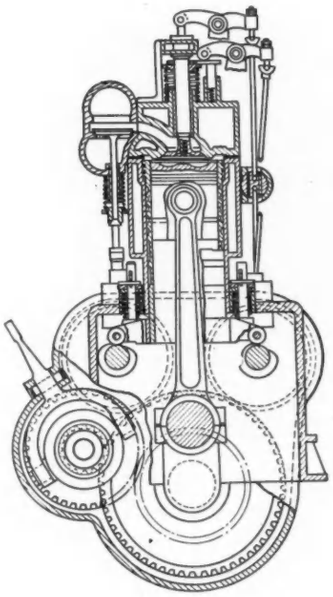


Fig. 1—Cross section through Claus Diesel engine

Reciprocating Sleeve in Claus Diesel Varies Cylinder Volume

WORK was begun recently on the construction of an experimental Diesel engine of an interesting new type, in which it is planned to control the combustion process by variation of the combustion-chamber volume by means supplementary to the crank train. The engine is the design of P. S. Claus, automotive engineer, who formerly was connected with Kinner Aircraft Corp. and who in the development of this engine is associated with B. F. Everitt of E.M.F. fame. The chief object aimed at by the new design is to eliminate the disadvantages due to ignition lag and the high combustion pressures resulting therefrom in high-speed Diesel engines of conventional design.

A sectional view of the engine is shown in Fig. 1. It will be seen that within the cylinder there is a sleeve surrounding the piston; that the wall of the sleeve is thickened at the upper end, and that the flange thus formed fits a counterbore in the cylinder. The sleeve has an intermittent reciprocating motion in the cylinder, being forced up therein by a pair of cams in the crankcase, and down by the gas pressure in the combustion chamber, assisted by the force of springs surrounding its two guide pins. The cams are so designed that they keep the sleeve in its highest position in the cylinder during the greater part of the cycle; they allow it to descend through a short distance toward the end of the compression stroke, and force it up into its highest position again shortly after the beginning of the expansion stroke.

The effect on the combustion chamber volume of the downward motion of the sleeve during the latter part of the compression stroke is contrary to that of the upward motion of the piston; consequently when the piston is still 15 deg. of crank travel from the top dead center, the combustion-chamber volume is very close to its minimum value, and the compression pressure therefore the maximum. Hence the air in the combustion chamber reaches the temperature at which the fuel ignites earlier in the cycle. When the fuel is injected, the temperature of the air in the combustion chamber being higher than in a conventional engine, the ignition delay period (ignition lag) is shortened. A diagram showing the variation of the combustion chamber volume with the crank angle is shown in Fig. 2. Another result is that since there is no further appreciable reduction of the compression-chamber volume after the crank has come within 15 deg. of the upper dead center, the maximum pressure of combustion will be materially lower than in the conventional high-speed Diesel.

The sleeve begins to move downward when the crank is about 45 deg. ahead of the top dead center and practically the maximum compression pressure is reached when the crank is still 15 deg. ahead of top dead center. From that point on to the top dead-center position of the crank there is practically no change in combustion chamber volume. During this time, of course, there can be no conversion of heat into mechanical energy. The sleeve continues to move down for some time after dead center has been passed; during this part of the cycle the chamber volume increases more rapidly than in a conventional engine, and under conditions of equal cylinder pressure conversion of heat into mechanical energy therefore would be at a more rapid rate. At 10 deg. after dead center the sleeve reaches the bottom of its stroke, and during the next 10 deg. of crank motion it is raised to the top of its stroke by the cams. During the remainder of the cycle, including the greater parts of the expansion and compression strokes and the whole of the exhaust and inlet strokes, the sleeve remains stationary in its topmost position.

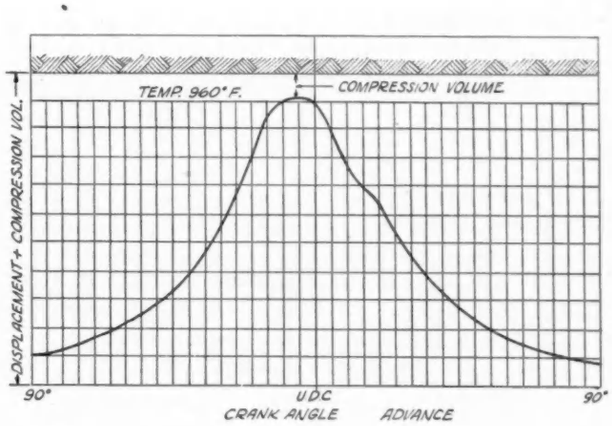
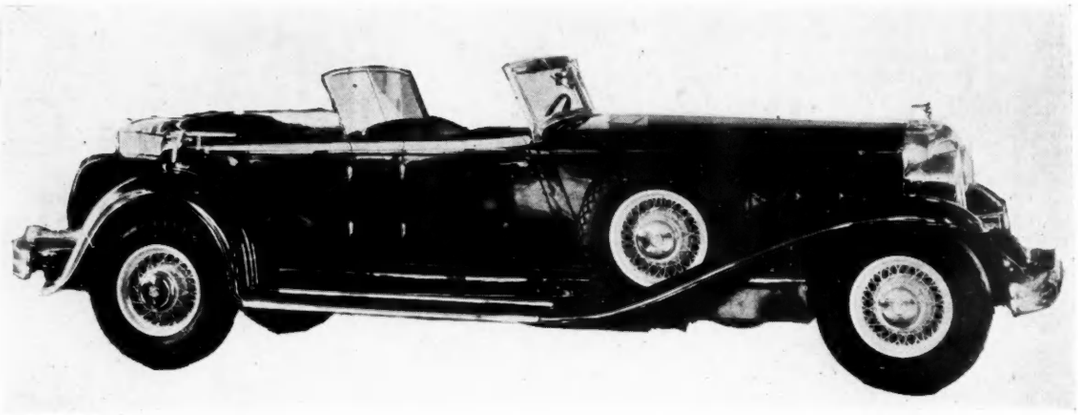


Fig. 2—Curve of displacement volume of Claus engine



LeBaron phaeton on a Chrysler custom Imperial chassis, showing that the elimination of the cowl is applicable to a long wheelbase car

Elimination of Cowl Probable, Says

by Athel F. Denham

WHILE the teardrop form might be an ideal shape for a body traveling through a completely fluid medium, it is not necessarily the most desirable form for an automobile, where the streamlining may be largely influenced by the fact that we are traveling over the surface of the earth in a fixed path. For instance, one of the problems in streamlining of automobiles which has not been solved as yet is the effect of side winds. Here the work done in connection with streamlining in aeronautics means virtually nothing. An airplane rapidly adjusts itself to winds not in the direction of its flight path by "slipping." We can't do this on the road.

"When you consider the variability of the winds on a road, with its greater number of turns, the effect of hills, of houses and trees, all affecting the magnitude as well as the direction of wind currents, our knowledge gained from aeronautical research can be regarded only as a starting point.

"Especially is this true of the rear-engine car. At speeds of 50 to 60 m.p.h., under normal conditions, perhaps there may be little evidence of trouble, but if speeds of 100 or 110 m.p.h. were reached, in sudden gusts of wind, such a shape, with the center of pressure ahead of the center of gravity, might cause a pure teardrop car with a blunt nose to go right off the road.

"We will probably have to find other forms and shapes to obtain the desired increases in efficiency with safety. This we are doing by wind-tunnel research, first on abstract shapes, duplicating as nearly as possible road conditions, and then by the addition of details and the combination of various forms. Only after this is done can we experiment with full-scale models to determine how we can use in an automobile the shapes our experiments have indicated as desirable either in themselves or in combination with others."

Ralph Roberts, chief designer, Briggs Mfg. Co., and vice-president of its custom-body affiliate, LeBaron, thus sensibly summarized the moot question of the teardrop type of car, which has been a major topic of conversation in the automotive industry of late.

Curiously enough, the conversation had started on the subject of hood design. The writer had been very much interested in the pleasing effect produced on the new De Soto and Chrysler Custom Imperial cars by the elimination of the cowl, and the extension backward of the hood to the windshield, as illustrated herewith. When we first saw it on the De Soto we realized that it represented a good means of giving the appearance of greater length to a car of relatively shorter wheelbase. The design, however, showed itself as equally effective in improving the lines of the Chrysler Custom Imperial. It made us realize that this detail of design, introduced to American passenger cars by Briggs, might have a definite place in the general design trend for the future.

Mr. Roberts' remarks confirmed that impression. He pointed out that modern "streamlining" trends started with a reduction in the number of vertical lines and the smoothing off of sharp body contours, reflected in the 1932 models by the sloping windshield, elimination of exterior visors, curved rear panels, etc. "Streamlining" of the body proper, he pointed out, resulted in some cases in an impression that the front end of the car had not been con-

Teardrop automobile body forms are all wet, but streamlining experiments are progressing and we shall reasonably soon reach a point where we know something definite about the wind-affected behavior of a car traveling in a fixed path. What then is the next stage of development?

Ralph Roberts, Briggs Designer

sidered as a part of the ensemble, although he realized that this would be more apparent to the designer than the public, accustomed as the latter is to the use of vertical lines for the hood and radiator.

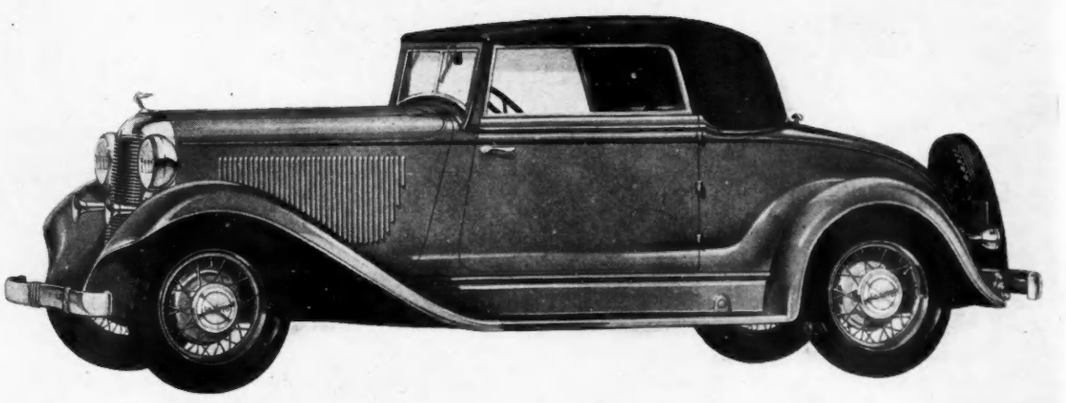
The discussion inevitably led to the question of the car of the future, and we asked Mr. Roberts for his opinion of the teardrop type. Part of his reply has already been recorded herewith, but there was much more to it than that. For instance, regarding rear-engine designs, he said:

"We are definitely interested in rear-engine cars, and for two reasons. First, they enable us to unify our assemblies, both as to chassis and body, in simpler and more natural groupings; this should result in lowered manufacturing cost and selling price. Secondly, they make possible a lowering of the center of gravity not only for safety, but also for increased body comfort by the provision of more leg room, etc., and an increase in performance by a reduction of the 'flat-plate-equivalent' of the car's wind resistance as viewed from the front."

Then, as always happens in a discussion of this kind, there arose the question of whether or not the public would be ready to accept either a rear-engine car, or whatever radical departure in body design might result from aerodynamic investigations such as Briggs is conducting. It was Mr. Roberts' opinion that the public probably would not — immediately. "It depends, of course," he said, "on just what we call a radical change. On the one hand we have some automobile manufacturers who merely change a few body details here and there, using, say, a narrower belt molding instead of a former wide type. To the manufacturer this appears sometimes as quite a radical move, accustomed as he is to seeing his own product. The public, however, may not even notice the change.

"On the other hand, another manufacturer may make what to him are a few minor changes elsewhere in the car, and if these changes are not in line with what the public imagines should follow the modern trend, that manufacturer may be regarded as too radical.

"The great American public," Mr. Roberts con-



De Soto convertible coupe showing how the elimination of the cowl gives the appearance of increased length

tinued, "is naturally conservative, and I do not believe it would be willing to accept too radical a change in car appearance at one throw."

We were inclined to disagree with Mr. Roberts on this point, believing as we do that the public has been led to expect some rather radical changes in automobile design, and that if a novel car, with design properly executed, were to be offered by an automobile company commanding the respect of the public, it would not take long to achieve fairly general acceptance.

However, the argument was too much in the abstract, so we asked Mr. Roberts whether he wouldn't sketch out for us one or two examples of future streamlining possibilities, based on developments known to be accepted by the public to date.

The result is shown elsewhere on these pages. One of the illustrations shows a rear-engined car on a 116-in. wheelbase, which Mr. Roberts said could be built to sell for well under $1,000. The other shows a further streamlining development on the present general type of chassis for a somewhat higher-priced car.

"Of course, these are only examples of some of the many things which might be done with automobiles, even without the availability of complete research material," Mr. Roberts stated. Our reaction to that was that if these were only examples, it is evident that we must possibly look more to the body manufacturer than the chassis designer for the major steps in the future evolution of the automobile.

The more streamlined "conventional" car, for instance (Fig. 3), embodies to us that element of dynamic appearance which manufacturers have been striving after for some years, and which they have often been handicapped in obtaining by the innate conservatism of the average car manufacturer. It seems, even in this single-plane sketch, without the advantage of color, to be in continuous motion.

While this factor is not as readily apparent in the rear-engine car sketch, that vehicle creates the impression that if it is one started it will be faster than anything we have today. There is a distinct question in our editorial mind which of the two types would appeal more to the public; appearance actively dynamic, or one in which the "movement" is latent.

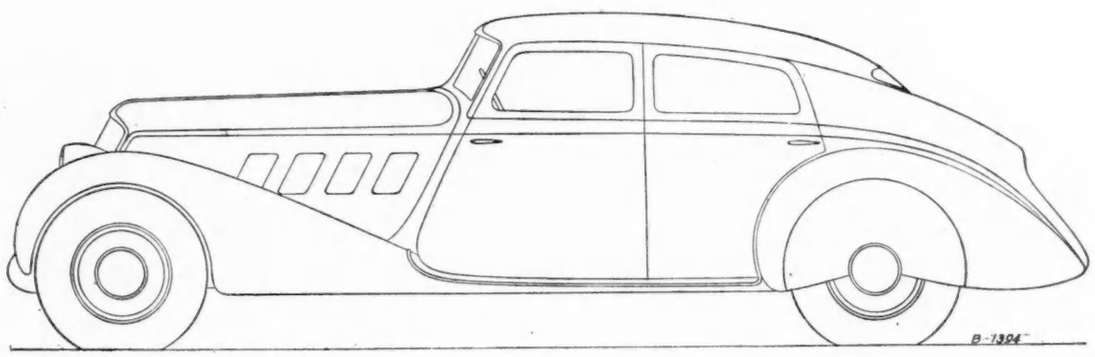
In either of these two examples, however, there is one self-evident factor. Neither one could be made quite as effective if the hood were not extended back to the windshield base, and the rear edge of its side panels made parallel with the line of the windshield and front-door pillar. A little imagination would quickly indicate how a vertical line at the rear of the hood and retention of a "cowl" would add an element of incongruity to these attractive cars.

We asked Mr. Roberts whether, aside from appearance considerations, there were other advantages inherent in the elimination of the cowl from the outer shell of the automobile.

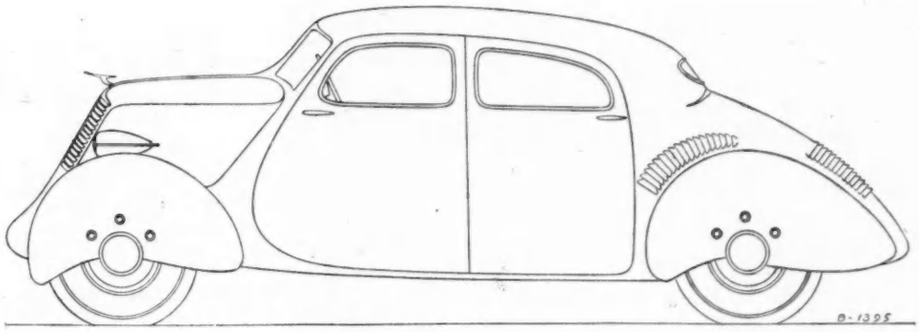
"Appearance, of course, is the major consideration," he replied, "but it does offer other possibilities. If we don't have to make our cowls conform to desired body contours, and are able to conceal them under the hood, they can be built with greater strength by proper shaping, ribbing and bracing. The added cost involved in the heavier stock required by the longer hood would largely be saved by the lowered manufacturing and finishing cost for the concealed cowl. In fact, it is entirely possible that in future designs not predicated as much upon previous design practice the cost over-all might be somewhat lowered over that of the conventional hood and cowl."

It certainly is interesting to note how streamlining developments to date lead into the future, as exemplified by Mr. Roberts' two sketches. Here there is to be found the 1932 sloping windshield. Rear body top panels, which became more rounded with the 1931 and 1932 models, are present with further curvature increases. There also are the sloping radiators, which have begun to make their appearance, and the concealment of chassis and wheels, especially at the rear, a development for the future already forecast by some of today's cars. Exterior visors would appear inappropriate, as would straight front pillars, or large radiator filler caps, etc.

The "imitation" hood at the front of the rear-engined car, while serving to conceal that portion of the body required for front compartment leg room, could be made also to serve as a compartment for the carrying of spare tires, etc., while ventilation for the body could be secured through louvers or shutters in that portion formerly occupied by the radiator. Front fenders on this car have been designed



A further idea in streamlining bodies on a fairly conventional chassis. This design is based on a $2,000 car.



This rear-engined car on a 116-in. wheelbase could be built to sell for well under $1,000. The body would cost less than that on a comparable front-engined chassis

to mount on the wheels in such a manner that they will turn to left and right with the wheels, as is done on some European cars, making possible a virtually complete cowling of the front as well as the rear wheels. They are readily removable for tire changes. Running boards are eliminated, as these would prove a hindrance rather than a help in entering or leaving so low a car, in spite of the ample provision for headroom. Doors and rear quarter panels on this car, Mr. Roberts says, would have considerable curvature, for streamlining, a detail which unfortunately does not show up in a line sketch.

An interesting and novel design for rear-end treatment of a more conventional car is also shown in the other sketch. Here the rear end is virtually in three sections. There is the rear top body panel, curving down into the intermediate section. The latter narrows from the body sides down into a vertical fin at the rear similar in basic conception to the design used on one or two of the high-speed cars which recently battled for world's records at Daytona Beach. This fin might be quite effective, not only in increasing speed by a reduction of eddy currents at the rear of the car, but also by adding to the car's directional stability. This middle portion in turn is streamlined into the lowest rear-deck section, into which are streamlined, in turn, the rear fenders.

Mr. Roberts, however, made his point with these sketches. While we still believe that the public would accept either of these two cars, it is quite possible that they might be just a little ahead of their time in one or two details. The question, of course, would then be whether or not the elimination of those details would seriously affect the complete result. The elimination of the cowl, for instance, would have appeared much more radical to us, were it not for the fact that this design detail is already incorporated in two of the 1932 cars.

Chrome Vanadium Bar Specifications Revised

VANADIUM CORP. OF AMERICA, New York, N. Y., has revised its specification 8B on Chrome-Vanadium Bars for Automobile Springs and its specification 9B on Elliptical Steel Springs for Automobiles. The new specifications are dated September, 1931, and supersede specifications dated May 1, 1927. The chemical specifications of the chrome-vanadium steel are changed in that the manganese range is now 0.65 to 0.90 instead of 0.60-0.90, and the chromium range 0.90 to 1.15 instead of 0.90 to 1.10. Additions have been made to the section on check analyses, which now reads:

(a) An analysis may be made by the purchaser from a finished bar representing each melt. The chemical composition thus determined shall conform to the requirements specified in Section 2.

(b) In case of dispute, check and arbitration analyses shall be made in accordance with the standard methods of analysis of alloy steels of the American Society for Testing Materials. (Serial Designation: A-55-24.)

(c) It is important that the bars be as free as possible from decarburization. Decarburization in excess of 0.005 in. in the bars is undesirable.

The specification of finish also has been changed and it is now specified that "the bars shall be soft enough to permit shearing *cold* without breaking *at shop temperatures,*" the words in italics being new.

In the specifications for elliptical steel springs for automobiles the following paragraph is added to the section on Check Analyses:

"It is important that the bars be as free as possible from decarburization. Decarburization in excess of 0.005 in. in the bars and 0.010 in. in the springs (after reworking or reheat treatment if necessary) is undesirable."

To the first paragraph in the section on Manufacture a precautionary remark is added to the effect that "prolonged soaking will cause decarburization." To the second paragraph of this section the following is added: "With proper quenching, the hardness of the plate as quenched will be over 555 Brinell. (It is desirable to temper quenched springs as soon as possible after removal from the quenching medium and before they have become cold.") The third paragraph of this section has been revised to read as follows:

"The manufacturer shall make a Brinell hardness test on leaves at suitable intervals, as a check on the heat-treating operation. The Brinell hardness number shall be preferably within the range of 388 to 429. A record of the Brinell hardness tests shall be available to the purchaser on request."

Photo courtesy S. A. Andre Citroen

PRODUCTION LINES

Production Lines of the Industry No. 8

Section of the forge shop at the Clichy Works of S. A. Andre Citroen in France. At the right of the main section is provision for steel storage. At the left is another division of forging operations. The main aisle of the shop is about 650 ft. long

Casting Shrinkage

The January issue of the Bureau of Standards Journal of Research reports the results of a study of the shrinkage of metals during casting. This was initiated at the request of the American Foundrymen's Association to determine the influence of shrinkage on the production of sound castings. Data are given for a number of non-ferrous metals and a cast iron.

Nitriding Steel

Recent research indicates that vanadium in unbound form is important in securing surface hardness in nitriding. This is the basis of a chrome-vanadium nitriding steel developed by the Electro Metallurgical Co. and described in the Electromet technical bulletin No. CVI. Some material concerning physical properties and heat treatment is also included. A rapid method of producing a very thin case is of great interest.

Complete Harmony

One of the problems in coach work is a good color match of upholstery fabrics. It is disconcerting to say the least to find a seat with two different shades of cloth. Yet it happens in the best of families. The reason is that makers of fabrics, like every one else, have to have production tolerances. And shades must vary to some extent from bolt to bolt. That's where specifications, mutually acceptable to buyer and manufacturer, come in. In the clothing industry the pieces for a garment are cut from one piece of goods—and kept together at assembly. Some reasonable variation may be of help in a high-production problem.

Tough to Shave

Norton research scores another hit in the completion of a study of the grinding of high carbon-high chromium steels. You'll find an interesting report in *Grits and Grinds* for January, 1931. In general they recommend a surface speed of 4800 ft. per min., work traverse 140 to 300 in. per min., cross feed 0.050 in. per pass. Best results were secured with dry grinding. Correct heat treatment was found to be a cardinal point. Here is some great stuff for people interested in die steels and die fabrication.

Get Your Man

The great drive for more S.A.E. members is on. We want production men to join. With your help and the weight of numbers, the production activity will help put the shop man in the limelight where he belongs. Let's go.

Stop Me If—

Don't read any further if you have heard A. K. (Brummy to me) Brumbaugh tell this one. It seems that a certain company reached that ideal (?) state where the individual was no longer a factor. No, all they needed was tables, charts and blue prints and the job would just roll on. One day something went wrong. A lot of cylinder blocks was completely ruined. The trouble seemed to be that the stud-holes were of varying depths but all too deep. Here's what the trouble-shooter found. The operator was absolutely right; over in one corner of the blue print was the legend—"drill - - - holes, allowance 1½ sec. per hole." So the holes were drilled by timing with a watch.

Rustless Markets

People are speculating about the markets for rustless steel. A year ago it looked like a cinch for radiator shells. But the picture changed. However, we know one organization that has found out a lot about deep-drawing stainless steel. Their experience may accelerate new uses. By the way, have you considered the possibilities of this material as a sheathing for commercial bodies, railcar bodies, aircraft structures, and the like?

How About It?

One of the men at the T&M session in Detroit said that service men have a lot of trouble with cylinder blocks. They sometimes break through in reboring because of uneven wall thickness. We suggested that the foundry would be tickled to death to get the field report. Foundry practice has progressed and today they know how to deal with shifted cores if they are told about it.—J.G.

MANUFACTURING MANAGEMENT METALLURGY

Average Power of Passenger Cars Jumps Nearly 60 Per Cent From 1925 Ratings

by P. M. Heldt

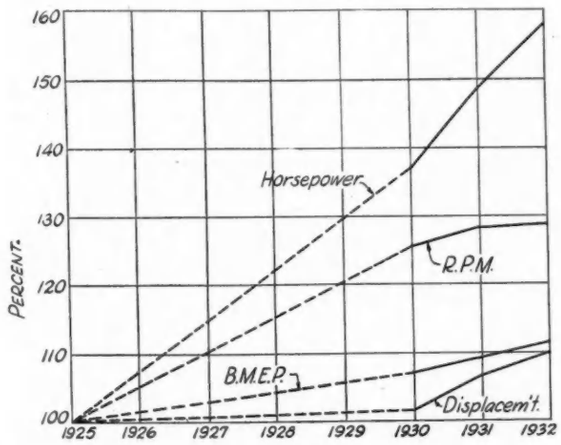


Fig. 1—Variation of engine horsepower and its components over a period of eight years

IN practically every review of passenger-car design for years past the statement has occurred that engine power is being increased. Generally the statement is made on the strength of individual announcements of manufacturers who in their new models have increased the piston displacement, the speed of revolution, or the compression ratio, and the cumulative effect of these individual changes over a number of years has rarely been investigated. Such an investigation is readily made, because all of the necessary data are published in the annual statistical issues of *Automotive Industries*. An analysis of the latest table of passenger car engine specifications brings out the rather startling fact that the mean of the maximum powers of all passenger car models listed is now more than 100 hp. Almost any one familiar with the offerings of the industry, when asked his estimate of the mean horsepower rating of current models, will give a considerably lower figure, and this is probably due to the fact that we all see much more of the Ford, Chevrolet, Plymouth and similar cars than of the Duesenberg 265 hp. and the Marmon 200 hp., hence our estimate of the mean horsepower is unconsciously warped, shifting toward the lower end of the scale, where the popular makes figure. Leaving out of account the one "baby car" which has figured in the lists the last two years, the actual mean of the horsepower ratings of all cars listed in the January, 1932, publications is 101.

This represents an increase over the mean rating of all 1925 cars of nearly 60 per cent. Passenger-car horsepowers have been increased in spite of the fact that during the years which have elapsed since 1925 our roads have been greatly improved. Road surfaces are now smoother, and grades have been cut down, so that the power required to cover a given distance in a given time with a car of given weight is now less than in 1925. The general results of the continual increase in power have been that automobile travel has greatly increased in speed and that automobiles are capable of much higher acceleration than six years ago.

Since the actual mean values of the different factors embodied in engine horsepower may be of interest, they are compiled in the following table:

Year	1925	1930	1931	1932
Displacement	259.5	264.7	276	285.4
B.m.e.p.	77.2	82.7	84.3	86.2
R.p.m.	2525	3170	3230	3250
Hp.	63.9	87.6	95	101

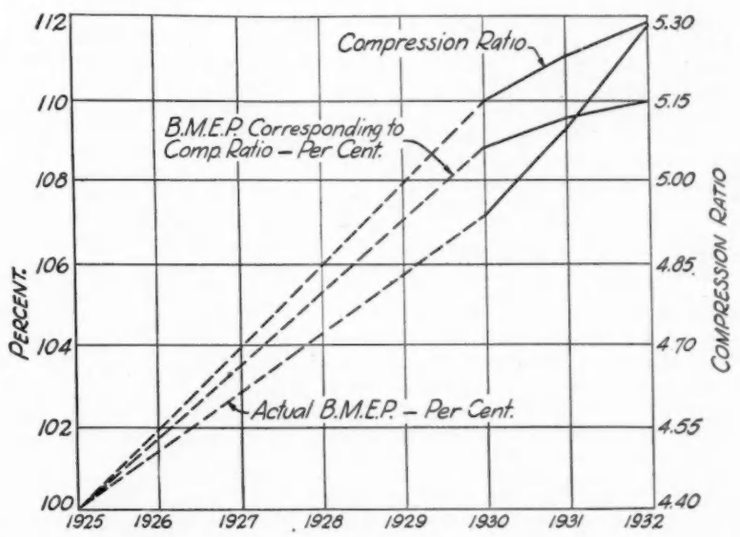


Fig. 2—Variation of the mean compression ratio and the mean b.m.e.p.

The increase in horsepower has been effected by increasing each of the three factors that contribute toward engine power, namely: piston displacement, brake mean effective pressure, and speed of revolution. In Fig. 1 the change in each of these factors since 1925 is traced. The mean value of each factor in 1925 is put down as 100 per cent, and it will be seen that on this basis each is now considerably larger than 100 per cent. Actual values of the different factors for the years intervening between 1925 and 1930 were not determined, and it is assumed that changes between these two years were uniform from year to year. The actual mean values were determined for 1930, 1931 and 1932, however.

It will be seen that during 1925 and 1930 the mean displacement increased very little and it is a fact that during the earlier part of that period displacements actually decreased. During the past two years there has been a notable increase in displacements, however, due to the production of a considerable number of multi-cylinder, high-powered cars.

There has been a more nearly uniform increase in brake mean effective pressures as determined from the values given for the horsepowers and the other factors of which it is composed. About the only way in which the brake mean effective pressure can be increased is by an increase in the compression ratio. Variation of the latter item during the period of eight years to which this survey applies is charted in Fig. 2. Theoretically the mean effective pressure varies with the compression ratio, but not in direct proportion thereto. The brake mean effective pressure, of course, will not vary exactly as the mean effective pressure, still the difference between the two is slight. The middle curve in Fig. 2 represents the b.m.e.p. which one would expect on theoretical grounds from the variation in the compression ratio over the period of eight years, and it will be seen that this curve in a general way follows the curve of actual b.m.e.p. rather closely.

More than any other factor the speed of revolution has been increased. In 1925 the average speed at rated horsepower of all passenger-car engines was 2525 r.p.m., while in 1932 it is 3250, which represents an increase of more than 28 per cent (as compared with 11.7 per cent increase in brake mean effective pressure, and 10 per cent increase in displacement). The curve would seem to indicate that the practical limit of speeds of revolution is being approached and that further progress in this direction will be very slow unless some new feature of construction should be introduced, such, for instance, as the use of magnesium pistons very much lighter than present-day aluminum alloy pistons.

Discussion of Free-Wheeling Lubricants Supplemented by Letter From Committees

(Continued from page 214)

automobile men appreciated the marketing situation, and as a result of this conference in the latter part of December a slight revision of the free-wheeling lubricants classification was made. In this revision the limits were widened slightly so that less difficulty would be experienced by the oil industry in putting these lubricants into general distribution.

Since this meeting was held in the latter part of December, there was not sufficient time to have this revision submitted to the membership of the S.A.E. Lubricants Committee for letter ballot and for other formalities necessary for presentation of this revision to the meeting of the Standards Committee at the annual winter meeting. Under these conditions it was decided that the proposed revision should be discussed before a joint committee meeting of the Lubricants Division of the S.A.E., members of Committee D-2 on Petroleum Products and Lubricants of the A.S.T.M., and the Committee on Testing Methods and Specifications of the A.P.I. In addition, a meeting of the Free-Wheeling Lubricants Committee of the automobile manufacturers was held, together with meetings of strictly commercial organizations such as groups of the individual automobile companies. A copy of this proposed revision, together with the call for the joint meeting which was sent out by the S.A.E. and A.S.T.M., is inclosed.

On Jan. 19, 1932, the meeting of the special committee of the automobile manufacturers on free-wheeling transmission lubricants was held in Detroit at the Book Cadillac Hotel. It will be noted in the second paragraph on page 3 of the minutes of this meeting that the free-wheeling lubricants committee adopted the revised specifications, and in the last paragraph on the same page they approved the program for having these specifications printed in the February issue of the S.A.E. Journal, etc.

At a meeting held in Washington on Jan. 22, Sub-committee 27 and the S.A.E. Lubrications Committee indorsed the specifications and voted in favor of the program of publishing them for information, and trying to get details worked out in time for the adoption and classification as soon as possible. Sub-committee D-2 and the A.P.I. committee were not asked to act.

At the meeting of the Standards Committee held in Detroit, Jan. 25, Mr. Upham, Chairman of the S.A.E. Lubricants Committee, gave the following report:

"The free-wheeling lubricant viscosity numbers as published in the Standards Committee report met with certain objections on the part of the lubricant distributors represented on the Lubricants Division. To meet these objections, revisions were made which have been adopted unanimously by the Special Committee on Free Wheeling Lubricants at a meeting held in Detroit, Jan. 19. This special committee, headed by Dr. James of the Studebaker Corporation is made up of representatives of automobile manufacturers using free-wheeling units.

"A meeting was held in Washington Jan. 22, which was a joint meeting of the S.A.E. Lubricants Division, the D-2 Committee of the A.S.T.M. and the A.P.I. Committee on Methods of Testing and Specifications.

"At that meeting it was voted to have the revised free-wheeling standards printed in the February issue of the S.A.E. Journal and the details of the Standards worked out with the A.S.T.M. D-2 Committee so that they can be recommended to the Standards Committee for adoption at an early date. While it is impossible to predict a definite date, it is hoped to be at the June meeting.

"I move, therefore, that the present recommendations to the Standards Committee be withdrawn and referred back to the division for further consideration."

E. W. UPHAM, *Chairman*,
S.A.E. Lubricants Committee.

H. C. MOUGEY, *Chairman*,
Sub-Committee XXVII of
Committee D-2, A.S.T.M.

Large-Area, Low-Pressure Tires Entering the Replacement Field

THERE have been placed on the market recently by several tire makers, automobile tires designed to be inflated to extremely low pressures, of the order of 10 lb. per sq. in. These tires are quite similar in appearance to those which have been used for aircraft landing gear for years, and one manufacturer refers to them as air-wheel tires, while another has adopted the name Jumbo tires. It is obvious that these low-pressure tires must have the same advantage over the balloon type that the latter has over the high-pressure tire, viz., the ability to absorb obstacles of larger size and the possibility of higher speeds over relatively rough roads.

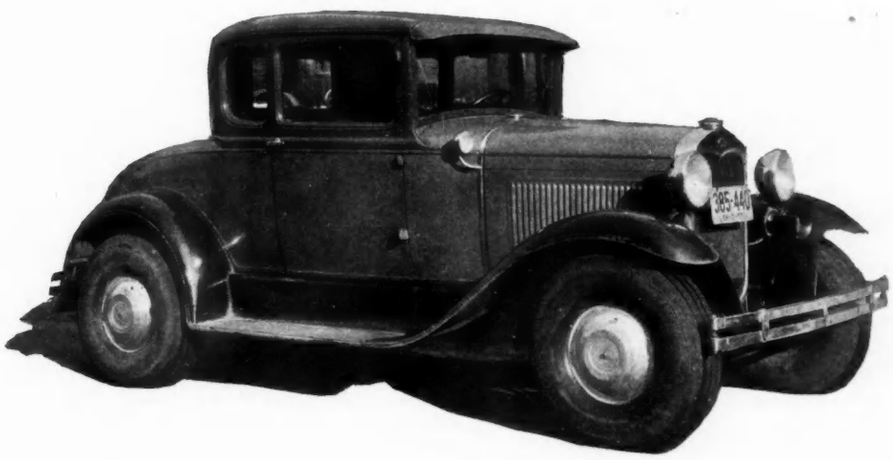
One man who has been working on tires of this type is A. J. Musselman of Cleveland, and a sectional drawing of a Musselman wheel for a Ford Model A car, equipped with 9/13-in. tire, is reproduced herewith. The wheels are of the disk type, demountable, and combined with the rim. The regular tires on the Ford Model A are 4.75/19 in., from which it will be seen that there is a great difference in the dimensions. The low-pressure tires naturally have a much greater maximum deflection, and, therefore, permit fairly smooth riding over obstacles of relatively large size.

One question that arises is how the car will behave when a tire of this type blows out at high speed. Owing to the fact that the effective diameter of the road wheel decreases so much more when a low-pressure tire is deflated, one is inclined to jump to the conclusion that the driver would have less control of the car than under similar conditions with a balloon or high-pressure tire.

We are informed that this problem has been studied by shooting at the tires with a gun from a short distance while the car was traveling at speeds of 45-60 m.p.h. It is stated that in no case did the car show any undue tendency to go into the ditch. In trying to explain this, the inventor states that, since the inflation pressure is so low, 10 lb. per sq. in., the tire deflates much less rapidly than would a high-pressure tire. Besides, with a tire of this size, the centrifugal force on the tread portion is an impoprtant factor as long as the car is traveling at high speed, and tends to keep the tire from collapsing. Furthermore, the base of the rim has a 10-deg. incline toward each flange and the tire is molded slightly under size, so that when the latter is placed on the rim the beads will draw toward the center of the rim, and when the tire is then inflated they are forced outward, up the incline and against the flanges, with the result that when the tire deflates after having been punctured, it is held on the rim by the tight fit of the beads on the rim base.

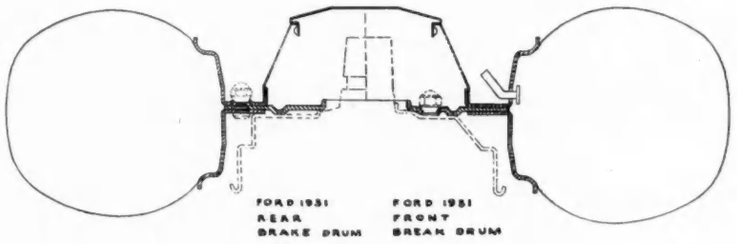
Another characteristic of some low-pressure tires is that they have a very large area of contact with the ground, and the load per unit of supporting area therefore is unusually small—of the order of 5 lb. per. sq. in. in the Musselman Ford application, for instance. This enables a car fitted with these tires to travel over soft and sandy roads with comparatively little effort, since the

General Streamline Jumbo tire



Ford car equipped with 9/13-in. low-pressure tires

Musselman pressed steel wheel with low-pressure tire



wheels will not sink in to any depth. The area of ground contact of the Musselman tire is said to be four to five times as great as with balloon tires.

The larger ground-contact area is claimed by the inventor also to result in superior anti-skid qualities, and he states that while the tires manufactured so far do not have any knobs or similar anti-skid formations on their treads, but are provided with either smooth or circularly grooved treads, they are perfectly safe in turning corners on smooth, wet pavements. The general theory, of course, has been that a tire is the more nearly free from skidding tendencies the greater the unit pressure at its ground contact surface, because a very high specific pressure, such as obtained with solid rubber tires on heavy commercial vehicles, for instance, is more likely to cut through the layer of slime on the road surface that is the chief contributary cause of skidding, and to get a good hold on the hard surface underneath. This principle, of course, ceases to apply when the specific pressure becomes so low that the tire can no longer cut through the layer of greasy material.

In accordance with the laws of dry friction, the maximum braking power should not be affected by any changes in the area of the ground contact if the road surface is dry. On the other hand, if the road surface is wet and greasy, the increased contact surface should affect the braking power favorably.

Another claim made for the tire is that it is almost immune from puncture, owing to the low pressure of inflation. The pressure is not enough to force an ordinary puncturing implement through the tire cover, and the tire merely molds itself to it, allowing most of the weight of the car to be supported on the ground. This claim, moreover, seems to be borne out by experience with regular balloon tires, which seem to be much less prone to punctures than high-pressure tires.

The effect on the effort required for steering a car would evidently not be favorable, because the resistance to the pivotal motion of the tire on the ground, for a given total weight supported, is greater the greater the area of contact. However, this need not be a serious objection in view of the large reductions in the steering gears now provided, especially if the knuckle-pivot axis prolonged is allowed to strike the ground slightly away from, instead of exactly at the center point of ground contact, in which case the motion of the tire on the ground when the wheels are being swung around for steering is partly rolling and partly sliding, instead of being purely sliding.

It is, of course, possible to combine a large air capacity with a normal area of ground contact, and this is the feature of the super-balloon tire marketed by the General Tire & Rubber Company of Akron, Ohio. This General Streamline Jumbo tire has a triangular section and holds two-and-one-half times as much air as an ordinary balloon tire designed to carry the same load. The air pressure for which the tire is designed is only about one-third that used in corresponding balloon tires. The tire is narrow at the tread and wide at the base. It is claimed for this tire that its form is such as to reduce the resistance to its passage through the air and that it is safer than ordinary balloon tires because the lower air pressure and wider base permit turns to be negotiated at higher speeds without danger of skidding and overturning. Steering is no more difficult than with the ordinary balloon, because the area of ground contact is no larger. The tendency to "side-roll" experienced with balloon tires is said to be eliminated. The tire attaches directly to an enlarged hub and practically eliminates the wheel.

Petroleum Products and Lubricants, Methods of Test

The American Society for Testing Materials has issued the annual report of its Committee D-2 on Petroleum Products and Lubricants, together with the reports of several subcommittees; included in this publication are 33 standard methods of test and 14 tentative test methods for products in this field. The book comprises 267 pages.

Standard methods of test are included for the determination of bitumen; burning quality of kerosene oils and of mineral seal oils; carbon residue of petroleum products; cloud and pour points; color of lubricating oils, of petrolatum and of refined petroleum oil. Tests for the dilution of crankcase oils, distillation of crude petroleum, gasoline, naphtha, etc., flash points, gravity by means of the hydrometer, and the analysis of grease are also given.

The Auburn Dual-Ratio Axle

In the description of the 1932 Auburn line appearing in the Jan. 9 issue of *Automotive Industries* some confusion may have been occasioned in connection with the dual ratio axle. While there are two "reductions" in this axle, that through the planetary gears is really an overdrive, as stated elsewhere in the story. The reduction through the bevel gearing is 5.1 to one and when the planetary gears are used also, these through an over-drive of 1½ to one reduce the total rear axle ratio to only 3.4 to one. In other words "low-high" involves the use of only the bevel gearing while in the "high-high" position the drive is taken through the bevel gearing and planetary gears.

Noblitt-Sparks Muffler Is Used on Rockne 75

The muffler for the Rockne Model 75 was manufactured by Noblitt-Sparks Industries, Inc., Indianapolis, instead of Sparks-Withington, as shown in the description of the new line published in our issue of Dec. 5. Noblitt-Sparks Industries, Inc., has been doing extensive experimental work on this muffler during the past two and a half years.

Effective Lubrication on New Rear Axle

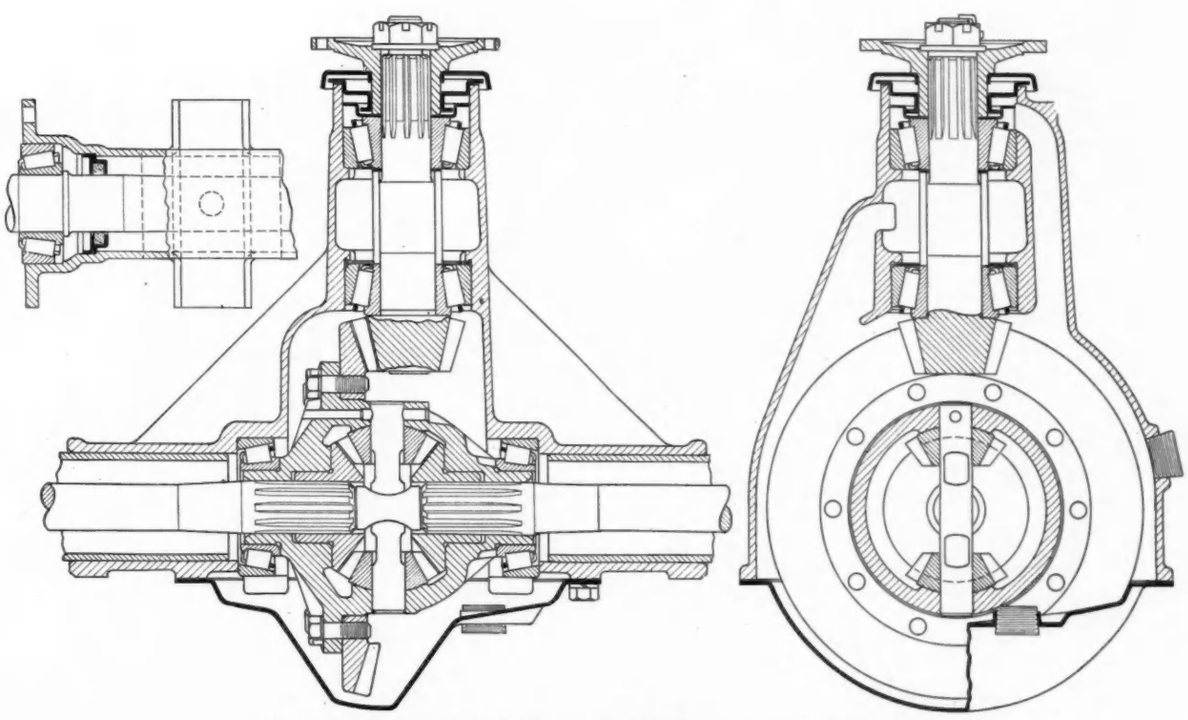
Salisbury product has center-housing cover of special design, which carries more lubricant to top of case. Spring saddles are of pressed steel welded to tubes

A NEW rear axle for passenger cars, known as the Model 30, was shown in New York at the time of the automobile show by the Salisbury Axle Co., Toledo, Ohio. Sectional views of the axle center and a detail of the axle end are shown herewith. It will be seen that the axle is of the built-up type, which is claimed to have certain advantages over the pressed-steel type. The axle tubes are forced into the bored holes of the hubs on the center housing under pressure and are then secured in place by welding at holes drilled through the wall of the hubs. The center housing has a large opening in the rear through which the bevel pinion, with its shaft, and the differential, with its driving gear, can be inserted. The pinion shaft is supported in two roller bearings and the mesh of the gears can be adjusted by placing shims back of the outer race of the rear bearing, which takes the end thrust due to the bevel gears. The differential gear, which is of the two-pinion type, is also supported in roller bearings which are mounted directly in the center housing, with caps.

From the drawing it will be seen that the axle tubes are upset at their outer ends to form a flange to which the brake backing plate is secured. The spring saddles are made of pressed steel and secured to the axle tubes by welding. Either welded or seamless tubes can be used for the axle tubes. The axle is of the conventional semi-floating type.

The cover of the center housing is of special design which is intended to favor oil flow in the housing. It will be noticed that the cover hugs the driving gear rather closely, and as a result the gear probably carries along more lubricant to the top of the case than it would otherwise. A special study was made of the problem of pinion mounting with a view to assuring effective lubrication. There is a chamber of considerable size between the two pinion bearings. Lubricant enters this chamber through an opening at the top and then works its way through the two bearings, that passing through the forward bearing returning to the housing through a channel provided for the purpose.

The ring gear is bolted on instead of being riveted on, it being the opinion of the manufacturer that bolting makes a superior job. Axle shafts are of chrome-molybdenum steel. The axle is suitable for passenger cars weighing 2600-2700 lb. ready for the road, and having engines developing a maximum torque of 130 lb.-ft.



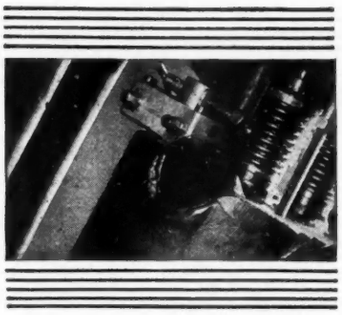
Sectional view of Salisbury semi-floating rear axle Model 30

Automotive Oddities—By Pete Keenan

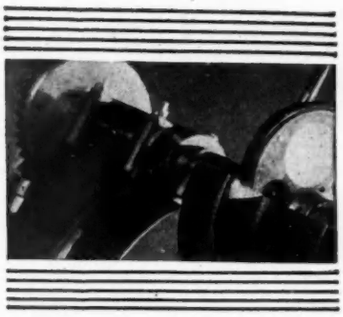
HISTORIC CALEDONIA INN NEAR SAN MIGUEL, CAL.— FOR WHICH A HIGHWAY WAS MOVED TO SAVE IT FROM DESTRUCTION
The orignal candidate for membership in the Caterpillar Club was Jodaki Kuparento, who made the first emergency parachute jump. Poland, 1808.
JOSEPH ELNITSKY, A COP, COLLIDED WITH ANOTHER CAR. HE ARRESTED HIMSELF UNDER THE CHARGE OF ASSAULT AND BATTERY WITH AN AUTOMOBILE. Phila, 1931.
DICK TREVITHICK WHO DEVELOPED THE STEAM CARRIAGE IN ENGLAND IN 1881. WAS ALSO THE CHAMPION WRESTLER. FOR THIS REASON PEOPLE DID NOT MOLEST HIM DURING HIS EXPERIMENTS.
AMOS JONES IS A CHAUFFEUR AND ANDY BROWN REALLY IS PRESIDENT OF "THE FRESH AIR TAXI CO." IN OAKLAND, CALIF.!

Do You Know An "Oddity"?

Correspondence about "Automotive Oddities" is invited. Contributions used will receive editorial mention when practicable. If you are interested in the source of, or the reason for, a particular "Oddity," ask the editorial department of Automotive Industries about it.



NEWS OF THE INDUSTRY



Receivers Named For DeVaux-Hall

Voluntary Receivership Granted by U. S. Court

GRAND RAPIDS, Feb. 10—George R. Scott, vice-president of DeVaux-Hall Motors Corp., and Frank G. Denne of the Grand Rapids Trust Co., have been appointed receivers of the DeVaux-Hall Motors Corp., by Hon. Fred M. Raymond, Federal judge.

The action of the court followed the filing of a petition of voluntary bankruptcy on part of the automobile company.

The receivership action disclosed that DeVaux-Hall had recently attempted to secure additional cash by sale of its Oakland, Cal., plant to the Chrysler Corp. Failure to agree on terms caused the deal to fall through.

Present liabilities of the company are reported to total $1,830,112, and assets total $1,923,095, which include real estate carried at $1,040,000. Unsecured claims total approximately $1,350,000. Cash on hand and deposited totals $415.80.

Dealers have been urged not to be alarmed, since the action was brought by the company to protect creditors and that it is expected that the court proceedings will bring about the speedy purchase of the company by a substantially financed group. R. H. Mulch indicated that the whole matter will be cleared up within ten days.

Business will be carried out as usual, with no interruption of production schedules on the new models, the management asserted.

E. C. McCobb of the DeVaux-Hall counsel pointed out that the filing of the suit in Grand Rapids will bring the valuable Oakland (Cal.) properties of the company under the jurisdiction of the Federal district court here, and thus make proceeds from the sale of these holdings available for paying creditors in the East.

Your stenographer or secretary should be told about volume 1 in the new Gregg Vocational Dictation Series, which covers the "Automotive Industry." In its 90 pages it goes a long way in explaining what you meant when you dictated that last letter to the Blatz Gadget Co., Inc., in restreamlined, non-integrated, protohypothetical unreciprocating thingumbobs. You certainly owe the poor girl an explanation of that.

Autocars (Burma), Ltd., successor to Ford Motors (Burma), Ltd., has just sent us a reprint from the Rangoon (Burma) *Times*, showing one of the most beautiful sales and service buildings we have ever pictured. The building is on the Signal Pagoda Road in Rangoon, and the account of it contains more atmosphere than ten folio volumes of Kipling.

Mann Egerton & Co., Ltd., Norwich, England, points with pride to a coachwork job recently completed by them on an Invicta chassis of 100 hp. Five headlamps and three horns provide for almost any fog condition, the makers point out. Carefully threading our way through a maze of dumb-irons, scuttle rails, squabs, boots, wings, and waist-rails contained in the description we can but agree.—H.H.

A New York inventor who was represented at the recent automobile show in that city is of opinion that what is wrong with our present automobile brakes is that there is too much friction in them. Accordingly, in a brake developed by himself he provides rollers between the brake shoes and drum and runs the whole assembly in oil. This theory may not square up with the law of the conservation of energy, but then we must admit that the validity of this law is not universally recognized; if it were not so, many perpetual motion schemes would be put forward. The inventor referred to is one of those who will not admit its validity, and his argument runs somewhat as follows: At Niagara Falls, when the waters are allowed to pass through the turbines, they generate electric current which gives us, among other things, our electric lights. If the waters are diverted past the turbines, all electric activity ceases at once, without either the water or the activity being transformed into heat. As Ripley says — "Believe it or not."—P. M. H.

THE NEWS TRAILER

Baby Ford For Sale In England by May

British Company Confirms Its Existence

By R. J. Politzer

LONDON *(by mail)*—The news that Ford was planning to enter the European baby car market first leaked out when a consignment of twelve Ford cars not more than ten feet in length was found being shipped from Detroit for England.*

It was then substantiated by Sir Percival Perry, managing director of the Ford Motor Co., Ltd., of England. The car is expected to be in production at the Dagenham plant by May. Although the new baby will be shown at the forthcoming Ford exhibition at the Albert Hall, the announcement of its birth is neither confirmed nor denied officially by the parents.

Ford's intention to enter the "baby car" field, now enjoying the greatest prosperity in Europe, has been welcomed as proving that the needs of the American and of the European markets are being differentiated when it comes to framing the respective policies of the English and American companies. That the eight-cylinder model which Henry Ford is expected to launch on the American market in the near future, would be planted on the English market was presumed in many, although ill-informed, European quarters.

That Ford has devised 8 hp. model to meet the European situation is a pleasant surprise.

At present no claims are made; no information regarding the car's performance is available. Photographs show it to be, at any rate as far as externals are concerned, almost identical with the existing types of "baby" for which British manufacturers have built up so firm a position—a position which is con-

**Automotive Industries*, p. 202, Feb. 6, 1932.

(Turn to page 238, please)

1931 Car Sales Show 27 1/3% Drop

Polk Shows 1,908,141 New Automobiles Sold; 2,625,979 Last Year

PHILADELPHIA, Feb. 11—The first official report of new passenger car sales for the entire year of 1931, according to R. L. Polk & Co., shows a total of 1,908,141 units, a decline of 27.33 per cent from the total of the preceding year and 38.44 per cent from the five-year average of 3,099,541 units.

Of the total sales, 24.46 per cent or 466,700 were made in Middle Atlantic States with other sections of the country following in the order named:

Zone	Sales 1930	Percentage of 1930 Total	Sales 1931	Percentage of 1931 Total
E. No. Cent.	602,207	22.94	426,178	22.34
W. No. Cent.	347,478	13.23	222,930	11.68
South Atl..	249,004	9.48	206,787	10.84
Pacific	244,338	9.30	170,742	8.95
New Eng...	199,017	7.58	164,729	8.63
W. So. Cent.	218,630	8.32	122,181	6.40
E. So. Cent.	118,487	4.51	74,476	3.90
Mountain..	83,262	3.17	53,418	2.80
	2,625,979		1,908,141	

Slightly less than 74 per cent of the year's sales were of low-priced cars, the division among the price ranges being:

Class	Total Sales	Percentage
Low	1,408,338	73.81
Medium	451,824	23.68
High	47,979	2.51

Contrasted with the five-year average, sales of new passenger cars during the four quarters of 1931 were as follows:

	Five-Year Average	1931
1st Quarter	665,501	461,750
2nd Quarter	1,061,149	715,370
3rd Quarter	858,298	474,969
4th Quarter	514,593	256,052
Total	3,099,541	1,908,141

Sales of commercial cars during 1931, according to the Polk company, aggregated 313,884 units, a decrease of 23.57 per cent from the 1930 record and 21.24 per cent from the five-year average of 398,568 units. Contrasted with the five-year average, the sales of commercial cars by quarters in 1931 were as follows:

	Five-Year Average	1931
1st Quarter	88,916	78,490
2nd Quarter	117,117	98,840
3rd Quarter	111,907	83,139
4th Quarter	80,628	53,415
Total	398,568	313,884

Shell Oil Building Tanker for Canada

TORONTO, ONT., Feb. 11—The Shell Union Oil Co. of Canada is the third large oil company in the Dominion to provide for the transportation of products on the Great Lakes and waterways of eastern Canada.

A tanker with a capacity of 600,000 gal. and carrying a crew of 21 is being completed at Newcastle-on-Tyne in England for the purpose.

Large storage tanks are being built at Hamilton to serve as the distributing point. The other companies using water transport in Canada are Imperial Oil, Ltd., and the McColl-Frontenac Oil Co.

Size of Injected Fuel Particles

According to an investigation by Dr. F. Sass of the German General Electric Co. regarding the average size of fuel particles in the spray of a Diesel engine, the mean diameter of the particles is 0.01 mm. or 0.0004 in. This is 1/33,000 the diameter of the CO_2 molecule, so that the volume of the average spray droplet is equal to the volume of 36,000,000,000 CO_2 molecules. Division of the fuel into droplets of 0.0004 in. diameter is effected mechanically, while the further division into individual molecules must be effected by heat. Of course, all of the fuel which is actually burned must first be reduced to the molecular state.

Toronto Will See New Ford March 5

Mid-Winter Show Is Delayed to Exhibit Rumored Automobile

TORONTO, ONT., Feb 11—The first national mid-winter motor show to be held here in more than a decade is scheduled from March 5 to 12 in the Automotive Palace of the Canadian National Exhibition, under the auspices of the Canadian Automobile Chamber of Commerce.

Decision as to the show dates was delayed in order to insure the first public showing of the new Ford models at Toronto. The Ford Motor Co. is not a member of the chamber of commerce but has been offered the privilege of exhibiting the new models.

D. R. Grossman, vice-president and general manager of Studebaker Corp. of Canada, Ltd., Windsor, is president of the Canadian Automobile Chamber of Commerce.

Parts Jobbers to Meet

NEW YORK, Feb. 8—Southeastern Parts Jobbers Association will hold its annual meeting in Atlanta, Ga., March 14 to 16, and the Southern Automotive Jobbers Association will meet there March 16 to 19. In conjunction with these two affairs, the second annual Atlanta Jobbers Equipment and Parts Show will be held March 15 to 18.

Goodyear Reports Profit

NEW YORK, Feb. 8—Goodyear Tire & Rubber Co. reports consolidated net earnings for 1931, after all charges, of $1,328,623.

1931 Tire Output Near 1930 Mark

Production of 2,643,221 Units in December Helps

NEW YORK, Feb. 10—Production of tires during December, 1931, totaled 2,643,221 units, according to figures prepared by the Rubber Manufacturers Association. This compares with 2,500,787 in November of last year, and with 2,814,086 units in December of the year preceding. This makes the total production for the year 48,740,275 units, as compared with 50,965,347 in 1930.

Shipments during the month were 2,781,295, as compared with 2,887,464 during the previous month, and with 3,361,200 in December, 1930. Shipments for the year were 50,060,690, as compared with 53,641,385 for the previous year. Shipments in all cases being higher than for the periods compared, inventories as of Dec. 31, 1931, dropped to 7,774,720 units, as compared with 7,919,034 on Nov. 30, 1931, and with 9,003,437 on Dec. 31, 1930.

Allis Reports Profit

NEW YORK, Feb. 8—Allis-Chalmers Mfg. Co., in a preliminary report for 1931, shows a net profit of $1,256,431. This is equivalent to approximately 96 cents a share on common stock, and compares with earnings of $3,604,609, or $2.86 a share for 1930. Earnings for the fourth quarter of last year were $46,657, as compared with $570,086 for the corresponding quarter of 1930.

Curtiss-Wright Enters Turkey

NEW YORK, Feb. 8—Curtiss-Wright Corp. has entered into a contract with the Turkish government to supervise and direct the building of airports and airways and the construction of planes in Turkey.

An airplane factory at Kayseri, Turkey, constructed three years ago, has been made available for the manufacture of American type planes, under the direction of Captain S. C. Coon of the Curtiss-Wright Corp. Major William B. Robertson is already on his way to Turkey to make airway surveys, and F. E. Hulse, airway specialist, will go there to assist in establishing mail, transport and military operations.

Kellogg Leases Canadian Plant

TORONTO, ONT., Feb. 11—The Kellogg Mfg. Co., Ltd., a new Canadian subsidiary of the Kellogg Co., Rochester, N. Y., has leased premises here to manufacture air compressors, paint spraying equipment and other Kellogg lines for the Canadian and export trade.

Men of the Industry and What They Are Doing

De la Cierva Sails

Juan de la Cierva, inventor of the autogiro, sailed for England on the Europa.

During his six weeks' stay in this country Mr. Cierva has been a guest at the home of Mr. and Mrs. Harold F. Pitcairn, Bryn Athyn, Pa., near the headquarters for American autogiro flight research, which are located at Pitcairn Field, Willow Grove, Pa. With the American engineers he has been continuously engaged in a series of experiments for the further development of the autogiro principle.

Lincoln Electric Promotes

B. F. McIntyre is now in charge of motor sales of the Chicago office of the Lincoln Electric Co., manufacturers of "Linc-Weld" motors and "Stable-Arc" welders. He was formerly with the Industrial Controller Co. of Milwaukee. His electrical engineering education was obtained in Toronto, Canada.

Fred Archer, formerly president of Fred Archer, Inc., has been appointed to the Philadelphia office of the Lincoln Electric Co. He is in charge of motor sales for this office. He was with the White Motor Co. and the Kelly-Springfield Tire Co. before forming his own concern.

Baldwin and Bishop Promoted by Pierce-Arrow

William M. Baldwin has been named director of advertising and sales development, a newly created division of the Pierce-Arrow Motor Car Co. factory organization.

He has been associated with the Pierce-Arrow Co. for 15 years, earlier as advertising manager and more recently as assistant general sales manager.

H. S. Bishop, who has been director of advertising, now becomes the company's advertising counsel, associated with the Roche Advertising Co. as vice-president.

Horace D. Millhone, who for the past year has been associated with Pierce-Arrow in an editorial capacity, will continue his work in the new division, as will C. C. Thoman, who serves as business manager.

Kenneth W. Vance and Norman O. Gilbert have been added.

Searle Becomes Worthington Executive

Clarence E. Searle, who resigned, effective Jan. 31, as general representative of the Allis-Chalmers Mfg. Co., Milwaukee, in charge of all sales, has accepted the position of vice-president of the Worthington Pump & Machinery Corp., New York, it is announced. He will direct all sales activities of the Worthington company. L. W. Grothaus, formerly assistant manager, electrical department, has been promoted to succeed Mr. Searle as general representative of Allis-Chalmers.

Higginbottom Joins DeSoto

Hugh Higginbottom has been named assistant to L. G. Peed, general sales-manager of the DeSoto Motor Corp., succeeding Fred Hunt, who becomes manager of the Philadelphia district. He brings to DeSoto 21 years' experience in the automobile business, starting with Dodge Brothers in 1911. In 1924 he joined the Oakland Motor Car Co. as Chicago district sales manager, serving successively as director of field operations, director of distribution and finally as Eastern sales manager. He left Oakland-Pontiac in 1930 to join Reo.

Plymouth Adds "Thrift Models"

DETROIT, Feb. 11—Plymouth Motor Corp. today confirmed the announcement of its two Thrift Models mentioned last week in *Automotive Industries;* the group will include a two-door sedan at $495 and a four-door sedan at $575.

Tags Net $18,000,000

SPRINGFIELD, ILL., Feb. 12—The automobile department of the secretary of state's department through sale of automobile license plates contributed $18,426,496 of the $22,352,415 fees collected by the department last year.

The auto division registered 1,411,261 passenger cars, 201,509 trucks, 3883 dealers, 5811 motorcycles, 9283 trailers and 93,059 chauffeurs.

Hayes and Sonora Merged in Canada

WALKERVILLE, ONT., Feb. 11—The Hayes Wheels & Forgings, Ltd., and the Sonora Corp., Ltd., have been merged under the new title of Hayes Products, Ltd.

Hayes will now assemble Sonora radio sets in Canada in addition to the continued production of automobile parts and Valkyr refrigerators, the latter having been added in 1931.

Canadian General Rubber Co., Galt, Ont., is a subsidiary of Hayes.

Slow Steel Orders Keep Mills Quiet

Ford's Tardiness and Small Rush Orders Add to Producers' Troubles

NEW YORK, Feb. 11—With Ford buying still in abeyance, little change is to be noted in either the volume or character of automotive commitments in the steel market.

Some of the Mahoning Valley finishing mills are working at a slightly better rate this week, due not to any increase in new orders, but to the scheduling of old orders which had been allowed to accumulate.

There is so much immediate shipment demand these days that it is quite an achievement for a mill to accumulate a sufficient backlog to permit more rational rolling schedules than is possible with rush orders.

In the Chicago market fresh weakness has developed in the sheet market. No. 10 cold-rolled are now quoted at as low as 2.20 cents and No. 10 hot-rolled, annealed, at 2.25 cents, Chicago district mill. These prices are $2 @ $3 a ton below those quoted at the turn of the year.

Reports of fresh declines in automobile body stock are a rehash of an old story. Unsorted stock has for several weeks been quoted at 2.80 cents, Pittsburgh, but strictly prime body stock is generally held at more nearly 2.90 cents.

The market is by no means strong and concessions on round tonnages would surprise no one, but there is a disposition these days to repeat declines over and over again in newspaper reports, when in fact only one decline has taken place. The strip market is holding its own.

Wire products rule steady. Sheet bars have yielded further ground in response to the lower prices for sheets. Demand for automotive alloy steels is of a narrow routine character.

Pig Iron—Most of the buying by automotive foundries continues to be in small lots. Here and there, however, blast furnaces show more activity. The markets generally continue easy in tone.

Aluminum—Quiet and unchanged.

Copper—Buyers are not greatly interested even though sellers have marked the price down to 6¼ cents, delivered Connecticut Valley. The market is now back at the low for 1931 which also constitutes the all-time low level.

Tin—Dull with spot Straits offered at 21¾ cents.

Lead—Quiet and easy.

Zinc—An advance of $1 per ton in the ore market gave zinc prices a firmer appearance.

Anthony Hoist in Canada

BRANTFORD, ONT., Feb. 11—The Canada Carriage & Body Co. is now manufacturing the Anthony pipeless hydraulic hoist and dump bodies heretofore imported from the Anthony Co. of Streator, Ill.

Ford Suddenly Tells of V-8, Price Change

DETROIT, Feb. 11—The history of Ford's dramatic change of plans on Dec. 7 when a decision suddenly was arrived at to make a V-eight instead of a four the major offering of the Ford line became public today as the result of an interview with Henry Ford.

What happened on that Monday morning was told in *Automotive Industries* for the first time on Dec. 19. Ford, last fall, decided to build an improved Model A. Orders went out for parts and raw material and 35,000 cars had been built when the order came through that day to cease all production and concentrate on development and production of the V-eight. Orders on parts for 50,000 more cars also were in effect.

The task confronting him, of course, was stupendous. Additional parts for the eight had to be designed and contracted for production elsewhere. Machinery had to be pulled out of production lines and new equipment installed. The knowledge that Ford had decided to concentrate on an eight then brought floods of letters urging that the four be continued.

For the time, as far as it affected the building of the eight, this unexpected demand was rather disconcerting. He then put half of his men to work making the improved model A and the other half in charge of changing the plant and equipment for the V-eight.

Ford was not willing to say when the eight should be ready nor the prices that would be placed on the cars. He did indicate, however, that the four would be priced lower than formerly. "I have just got back my old determination," Ford stated, "to get the price of an automobile down to the mark where the public can buy it."

Both the V-eights and improved fours will have roomier bodies of new design, longer wheelbase, lower chassis and heavier frames. Motors will be interchangeable on the two chassis. Production will start some time this month with the first public showing early in March.

Ford's "Baby Car" Will Enter Highly Competitive European Motor Market

(Continued from page 235)

tinually improving at the expense of the higher rated models.

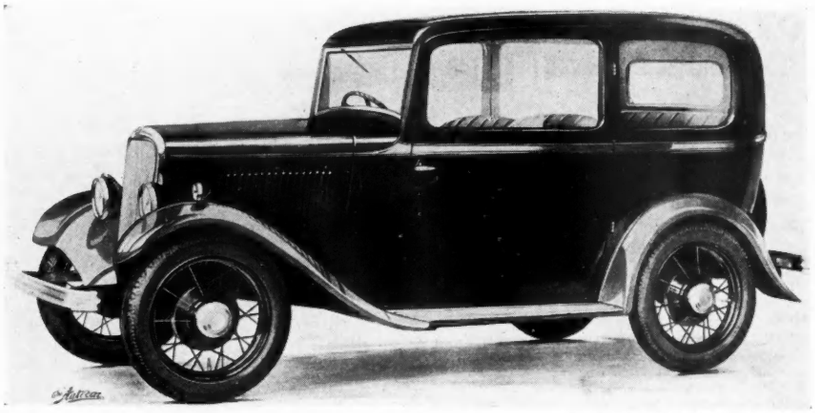
The new car will enter a vigorously competitive market. With an untried weapon they are challenging such established champions as the Austin, Morris, Triumph, Singer, etc.—all products that today stand as the result of continuous technical adjustment based on years of running experience. No decision has yet been reached with regard to price but while it is expected to be competitive, it is not expected to give Ford a handicap. Again, the source from which the twelve baby models emanated suggests that the new car has been developed in America—possibly by American engineers—and it is conceded here that baby cars are not a field in which the American designer will claim any very convincing skill.

A reasonable criticism of the new Ford move would be that instead of complicating the Dagenham production program and adding the expense of a different manufacturing unit, the company should have concentrated on reducing the retail price of the present, or of an improved "A" model, until they were offering a big car at the price of current baby models. However, in England, at any rate, there is a point beyond which price reductions are ineffective in respect of a car on which running costs, including tax, insurance, petrol, oil, cleaning and garaging, remain constant. A car is bought out of capital, except in the case of instalment plan purchase; it is run out of income. A Ford car in England at present costs around £200 or $690 at current rates ($1,000 at par); to run it costs about £100 or $345 ($500 a year), comprising tax £15 (or over £16 if paid quarterly), insurance £15, garaging and cleaning £40, repairs £5, petrol and oil for 10,000 miles at 25 miles per gallon and 1s/4½d per gallon, roughly £25. It is this £100 running figure, not the £200 initial outlay, that is the more deciding factor in purchasing a car in England.

To enter the baby car market with tax and insurance each at £8, doing 40 miles to the gallon, and with garaging, cleaning, spares and repairs all correspondingly reduced, was tempting. Registration statistics both in England and Germany make it more so. New registrations in the 8 hp. class in the United Kingdom amounted in 1929 to 23.73 per cent of total new registrations; in 1930 the proportion rose to 25.59; whereas the percentage of all cars on the road at the end of Sept., 1930, was 14.27. In June last baby cars accounted for 35.3 per cent of total new registrations in Germany.

However, on the Continent, as in England, the Baby Ford will encounter established competition, for the Baby Austin is manufactured under the name of Rosengart in France and Dixi in Germany; and in France there is the Baby Peugeot and in Germany the Hanomag and D. K. W., not to mention the Opel.

One interesting aspect of the new departure is Mr. Ford's antipathy to the lower horsepower engine which is specially made for the "A" model in Europe on account of the taxation by horsepower. A direct result of his last trip to Europe was a readjustment of prices whereby the more powerful engine (24 hp.) was listed £5 or $17.25 at present rates ($25) cheaper than the less powerful (15 hp.). However, a saving of £5 in the initial cost is not likely to weigh long with a purchaser who would have to pay a regular £18 extra per year in tax and insurance.



Courtesy of *The Autocar*, London.

The new Ford midget car, designed for British and Continental markets, appears to be a compromise in design between British and American practice in the light car field

British G.M. Drops U. S.-Built Lines

Personnel and Products of General Motors Will Lose all U. S. Identity

LONDON (Special to *Automotive Industries*) — General Motors Ltd., British subsidiary of General Motors Corp., will henceforth be one hundred per cent British throughout, from the personnel to the products produced. The company will no longer handle the Buick in Britain, but has appointed Messrs. Lendrum & Hartman, Ltd., London, W. 1, sole concessionaires in Great Britain and the Irish Free State.

American products only accounted for four per cent of the total business of the English G.M. subsidiary during 1931. The depreciation of sterling and the expected imposition of a further tariff, would cause this proportion to dwindle still further during 1932.

The LaSalle has been dropped; not more than a dozen Cadillacs were sold during the past year, and the heavy increase in price necessary to cover the exchange differentiation practically disqualifies the car as far as the British market in 1932 is concerned. Prices for the 1932 Buick models have not yet been fixed here but it is expected that the new Buick will cost here about £500 or $1,725 at current rates ($2,500 at par), as against £398 or $1,373 ($2,000) for the 1931 models. Messrs. Lendrum & Hartman will assemble the chassis, which will henceforth be imported from Canada instead of from the U.S.A., and are cooperating with British coachbuilders in the design of bodies to be fitted to the Canadian chassis. On one model only will bodies be imported.

The British company manufactures the British Chevrolet truck, the Vauxhall car and the Bedford truck, at Luton, Bedfordshire. The Chevrolet passenger car used to be imported from America but was abandoned some time ago since the car could not be sold in England under £240 ($1,200) and the horsepower tax of £27 was too heavy for the £200 market. The company itself manufactures an all-British Chevrolet truck which differs in certain respects from both the American and Canadian products; the truck was first imported in June, 1923; sales soon reached considerable volume and a complete building line was installed at Hendon in 1924.

Gradually an ever-increasing proportion of materials and parts for the production of the truck was purchased in Britain, until, with the acquisition of the English Vauxhall company in 1925, it was possible to manufacture an all-British Chevrolet truck. The Vauxhall company has become a purely manufacturing company and will be allowed to show a satisfactory profit on its manufacturing activities, General Motors, who own all the ordinary capital and most of the preferred stock, undertaking the distribution of its products.

The Vauxhall plant at Luton has been greatly enlarged and improved and Vauxhall cars and Chevrolet and Bedford trucks are now assembled on the same assembly line, thus maintaining production and employment at an unusually even level. The production of a new Vauxhall model, called the "Cadet," in which American design plays a prominent part, has increased Vauxhall sales by approximately five hundred per cent.

Two differently rated Vauxhall engines are made, one a 27 hp. engine specially designed for the export markets. Two Chevrolets are also available, the 12 cwt. chassis which sells at £140 and the 30 cwt. chassis which sells at £175; both these models have a peculiarly good market and are successfully satisfying the demand for low-priced light transport. In March, 1931, the company entered the heavy field with a two-ton model called the Bedford, here again specially designed for export. The Bedford short chassis retails at £198, while there is also available a long chassis both as a truck and as a 20-seater bus.

Chevrolet and Bedford trucks together rank second (to Ford) in sales volume in the British Isles and between March, 1930, and October, 1931, approximately 17,000 were produced. Since to distribute the American, Canadian and English Chevrolet in the same markets would cause endless confusion with regard to the replacement of parts, which are by no means interchangeable, the British company is not allowed to export the British Chevrolet as such. The 12 cwt. and 30 cwt. trucks are, however, exported under the name of the Bedford along with the latter's two-ton model.

And these are reported to be doing exceptionally well, chiefly thanks to sterling and other currency depreciation which has in so many countries handicapped American products.

General Motors Sales Decline

January Figure Below That for Same Month of 1931

NEW YORK, Feb. 8—January sales of General Motors cars to consumers in the United States totaled 47,942, as against 61,566 for the corresponding month a year ago.

January sales of General Motors cars to dealers in the United States totaled 65,382, as against 76,681 for the corresponding month a year ago.

January sales of General Motors cars to dealers in the United States and Canada, together with shipments overseas, totaled 74,710, as against 89,349 for the corresponding month a year ago.

C. E. Dawson, president, General Motors Fleet Sales Corp., reports that combined sales of General Motors cars and trucks to large national fleet users for January were 55 per cent ahead of the same month last year.

SALES TO CONSUMERS IN UNITED STATES

	1932	1931	1930	1929
Jan.	47,942	61,566	74,167	73,989
Feb.		68,976	88,742	110,148
March ..		101,339	123,781	166,942
April ...		135,663	142,004	173,201
May		122,717	131,817	169,034
June ...		103,303	97,318	154,437
July ...		85,054	80,147	147,079
Aug. ...		69,876	86,426	151,722
Sept. ...		51,740	75,805	124,723
Oct.		49,042	57,757	114,408
Nov. ...		34,673	41,757	68,893
Dec.		53,588	57,989	44,216
Total ..		937,537	1,057,710	1,498,792

SALES TO DEALERS IN UNITED STATES

	1932	1931	1930	1929
Jan.	65,382	76,681	94,458	95,441
Feb.		80,373	110,904	141,222
March ..		98,943	118,081	176,510
April ...		132,629	132,365	176,634
May		136,778	136,169	175,873
June ...		100,270	87,595	163,704
July		78,723	70,716	157,111
Aug. ...		62,667	76,140	147,351
Sept. ...		47,895	69,901	127,220
Oct.		21,305	22,924	98,559
Nov. ...		23,716	48,155	39,745
Dec.		68,650	68,252	36,482
Total ..		928,630	1,035,660	1,535,852

TOTAL SALES TO DEALERS IN U. S. AND CANADA PLUS OVERSEAS SHIPMENTS

	1932	1931	1930	1929
Jan.	74,710	89,349	106,509	127,580
Feb.		96,003	126,196	175,148
March ..		119,195	135,930	220,391
April ...		154,252	150,661	227,718
May		153,730	147,483	220,277
June ...		111,668	97,440	200,754
July		87,449	79,976	189,428
Aug. ...		70,078	85,610	168,185
Sept. ...		58,122	78,792	146,483
Oct.		25,975	28,253	122,104
Nov. ...		29,359	57,257	60,977
Dec.		79,529	80,008	40,222
Total ..		1,074,709	1,174,115	1,899,267

Unit sales of Chevrolet, Pontiac, Oldsmobile, Buick, LaSalle and Cadillac passenger and commercial cars are included in the above figures.

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

NEW YORK, Feb. 11—Colder weather in many sections of the country last week brought a much needed stimulus to retail trade in seasonal lines. At best, general business was only fair. Weakness developed in the commodity markets; and prices of wheat, oats, rye, corn, rubber, sugar, hides, and cocoa declined. Raw sugar, at less than one cent a pound, was selling at the lowest level ever recorded.

Department store sales in the New York City area during the first half of January were about 16 per cent below those in the corresponding period last year. The decline is considerably larger than in the few months preceding and is attributed to the unseasonable weather.

RAILROAD FREIGHT LOADINGS OFF

Railway freight loadings during the week ended January 23 totaled 562,938 cars, which marks a decrease of 10,338 cars below those during the preceding week, a decline of 152,536 cars below those a year ago, and a decline of 299,408 cars below those two years ago.

ELECTRICITY PRODUCTION DOWN

Production of electricity by the electric light and power industry in the United States during the week ended January 30 was 5.8 per cent below that a year ago.

CRUDE OIL PRODUCTION UP

Despite efforts to curtail crude oil production, average daily output for the week ended January 30 amounted to 2,170,800 barrels, as against 2,161,500 barrels for the preceding week and 2,085,950 barrels for a year ago.

COAL TONNAGE DECLINES

Production of coal in the United States continues to decline. Production of bituminous coal during the week ended January 23 totaled 6,383,000 tons, as against 6,887,000 tons during the preceding week and 8,835,000 tons a year ago. Production of anthracite during the week ended January 23 amounted to 823,000 tons, as against 961,000 tons during the preceding week and 1,428,000 tons a year ago.

FISHER'S INDEX LOWER

Professor Fisher's index of wholesale commodity prices for the week ended February 6 stood at 64.2, as against 64.5 the week before and 65.2 two weeks before.

BANK DEBITS OFF 25 PER CENT

Bank debits to individual accounts outside of New York City during the week ended February 3 were 25 per cent below those a year ago.

WAR RUMORS DEPRESS MARKET

The stock market developed some strength during the earlier part of last week, but subsequent weakness brought general prices lower. For the week as a whole the market was dull, and trading on a few days fell below a million shares. The current weakness in the market is attributed to uncertainties regarding the military operations in China.

FEDERAL RESERVE RATIOS STEADY

The consolidated statement of the Federal Reserve banks for the week ended Feb. 3 showed an increase of $17,000,000 in holdings of discounted bills. There were decreases of $6,000,000 in holdings of bills bought in the open market and of $3,000,000 in holdings of Government securities. The reserve ratio on Feb. 3 was 67.1 per cent, as against 67.4 per cent the week before and 67.3 per cent two weeks before.

Monthly Estimates of Foreign Stocks of Motor Vehicles, as of Dec. 1931

WASHINGTON, Feb. 11—The following information, based upon data obtained from the most reliable sources, was supplied by the foreign offices of the Bureau of Foreign and Domestic Commerce. Every care was used in the preparation of the estimates which are made only after careful investigation.

"High" means that the supply is considered large in relation to current state of demand.

"Normal" is used almost synonymously with "adequate," that is, when the volume on hand is sufficient to supply immediate requirements plus the estimated demand for 1 to 1½ months.

"Low" means that the volume on hand is not considered sufficient to supply immediate requirements.

	PASSENGER CARS								TRUCKS AND BUSES			
	Low Priced		Medium Priced		High Priced		Used Cars		Heavy Capacity		Light Capacity	
Country	U. S.	Other	U. S.	Other	U. S.	Other	U. S.	Other	U. S.	Other	U. S.	Other
Australia	U-H	H	H	N	H	N	N	L	N	U-L	H	L
New Zealand	U-L	L	H	N	N	N	H	H	N	N	L	L
Austria	L	L	L	S-H	L	N	H	H	None	S-H	L	S-H
Belgium	N	N	L	L	L	L	N	N	L	L	N	N
Czechoslovakia	U-L	N	L	H	N	H	L	U-H	N	H	L	N
Denmark	N	N	N	N	H	N	N	N	N	N	N	N
France	H	U-H	N	H	N	H	N	H	None	N	L	H
Germany	L	N	U-L	N	L	N	H	U-H	None	N	N	N
Greece	N	H	L	H	L	L	N	N	L	L	N	N
Netherlands	L	H	L	L	H	N	S-L	L	N	L	L	H
Poland	L	N	U-L	L	None	None	H	U-H	L	L	L	N
Portugal	L	H	L	N	U-L	U-L	N	H	L	L	N	L
Rumania	S-L	S-H	S-H	N	S-H	L	U-H	N	L	L	N	H
Spain	L	L	U-L	U-L	U-L	U-L	U-L	U-L	U-L	U-L	N	U-L
Sweden	L	..	L	..	N	..	N	N	N	..	N	..
United Kingdom	N	H	N	N	N	H	L	H	None	N	N	N
Norway	N	N	H	N	L	L	H	H	L	L	N	N
Argentina	N	N	N	N	N	N	L	..	H	..	N	..
Chile	L	N	L	N	L	N	L	L	L	L	L	L
Colombia	U-L	None	L	None	U-L	None	L	None	L	None	U-L	None
Peru	N	N	N	N	N	None	H	N	N	None	N	None
Uruguay	L	L	U-L	L	None	None	L	L	U-L	U-L	U-L	U-L
Mexico	U-L	None	U-L	None	U-L	None	N	None	U-L	None	U-L	None
Panama	N	None	N	None	N	None	N	None	N	None	N	None
Porto Rico	L	None	L	None	L	None	None	None	L	None	N	None
Cuba	L	None	N	N	N	N	N	N	N	None	N	None
Gold Coast	N	N	N	N	None	None	L	N	N	S-H	N	N
Union South Africa	N	N	L	L	U-L	U-L	N	N	L	L	N	N
China*	..	..	..	..	..	..	..	..	..	..	..	..
India	N	L	N	N	L	N	H	H	L	L	H	H
Philippines	L	L	L	L	L	L	L	L	L	L	L	L
Siam	N	L	L	N	None	None	H	H	L	N	N	N
Japan	U-L	N	N	..	N	..	N	..	H	..	N	..
Netherland E. Ind	N	H	H	H	None	None	H	..	L	L	H	H

* Shanghai stocks American and British cars and trucks below normal; stocks French and Italian cars heavy; Hong Kong and South China stocks normal.

H–High L–Low N–Normal U–Unusually S–Seasonally ..–No information forwarded

German Research Institute of Aviation Makes Engine Report

The annual report of the Engine Division of the German Research Institute for Aviation (Jahresbericht der Motoren-Abteilung der Deutschen Versuchsanstalt fuer Luftfahrt), Berlin-Adlershof, for the year 1931, has been published recently by R. Oldenbourg, Munich and Berlin.

In addition to a general account of the activities of the V.D.L. during the business year 1930-31, the publication contains a report of scientific work of the Engine Department during the year, extracts from all reports of the last business year, and eight reports complete. These latter cover:

The first deals with mechanical stresses in the mechanism of carburetor-type aircraft engines. Then follows an investigation regarding the prospects of jet propulsion for airplanes, with special consideration of exhaust-gas jet propulsion. The results of a practical investigation on an Argus-Roots aircraft engine supercharger are clearly described. A theoretical investigation shows the possibilities of the supercharging principle under the most favorable conditions. Two papers are devoted to the subject of torsional vibration, one dealing with the excitation of torsional vibration and the other with the VDL torsiograph, an instrument for recording torsional vibration in aircraft engines. An extensive paper is devoted to reduction of fire hazards in airplanes. The final report covers experiments on the timely problem of detonation in carburetor-type engines.

Court Names Receiver

MILWAUKEE, Feb. 12 — The Milwaukee Circuit Court has appointed F. G. Osborne receiver for the Zenith Mfg. Corp., manufacturer of automotive replacement parts, such as cylinder heads, etc. The Motor Castings Co. petitioned claiming that the Zenith company has failed to pay a judgment.

Reo Turns Canadian Manufacture and Sales Over to Dominion Motors

Agreement Ends 27 Years' Operation by Ontario Subsidiary; Scott, Reo President, Sees Great Opportunity in Hook-Up with Canadian-Owned Firm

LANSING, MICH., Feb. 12 — Reo Motor Car Co., which operated since 1904 under a similar name in Canada, has concluded arrangements with Dominion Motors, Ltd., of Toronto, for the exclusive manufacture, sale and service in Canada of Reo passenger cars and commercial vehicles.

Richard H. Scott, president of the Reo, sees many advantages and great opportunities in this new hook-up. He has contended that a company operating in the automobile business in Canada should be a Canadian company with Canadian capital, employing Canadian labor and using Canadian materials; and in this new connection with Dominion Motors the Reo is being represented by the only automobile company in Canada controlled and directed entirely by Canadians.

Dominion Motors' factory at Leaside, a suburb of Toronto, has a floor space of 500,000 sq. ft., covering approximately 15 acres. The company has a paid-up capital subscribed by the Canadian public of $3,000,000. Dominion Motors manufacture the Frontenac and Durant.

Dominion Motors is directed by Roy D. Kerby, a Canadian by birth, who has spent 20 years in the automobile industry in Canada, 14 of which were spent with the McLaughlin interests of Oshawa and General Motors Corp., the balance of the time in charge of the affairs of Durant of Canada and his present company. Mr. R. H. Scott is a Canadian by birth.

This new connection also brings about an old association between two veterans in car sales, Elijah G. Poxson, general sales manager of Reo, and Phil J. Duggan, sales manager of the Canadian company. Both were proteges of J. Dallas Dort, where Poxson worked with the parent organization in Flint and Duggan was with the Canadian organization in Chatham, Ont.

It is anticipated that production in the Canadian plant on passenger cars will begin not later than the middle of March, but production of commercial vehicles will be within the next two or three weeks.

Officers of Canadian Reo are: Roy D. Kerby, president of Dominion Motors, president; Phil. J. Duggan, vice-president; J. A. Brand, secretary-treasurer.

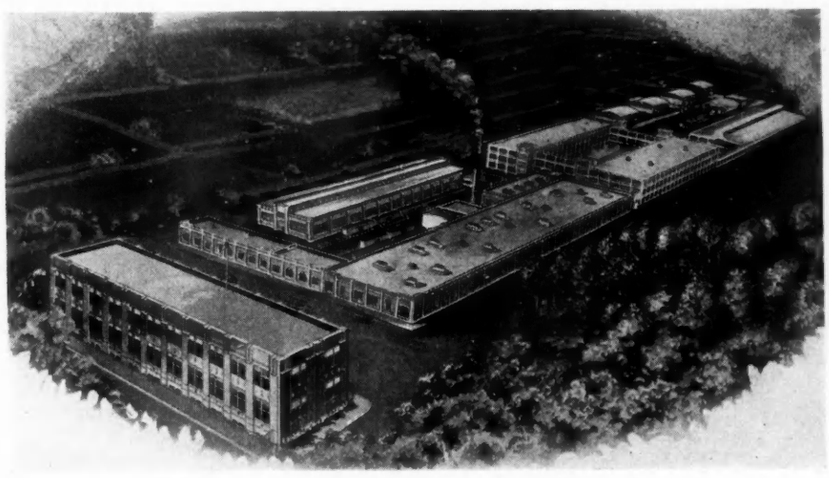
Traffic Group Discusses Rates

NEW YORK, Feb. 11—The National Automobile Chamber of Commerce Traffic Committee, headed by E. N. Hodges, of Hupp Motor Car Corp., met in Detroit yesterday with rail representatives to discuss the continuation of the special rail tariff on shipments of automotive products inaugurated about a year ago.

Railroad representatives indicated an interest in obtaining a greater portion of the shipments of the new cars to distances within the 500-mile radius of factories on the basis of the special tariffs inaugurated last year.

Following yesterday's meeting, traffic managers of the automotive companies are meeting today to consider proposals for state and interstate regulations of commercial vehicle operations as proposed in Examiner Leo J. Flynn's report to the Interstate Commerce Commission.

The question specifically before this committee is the apparent denial to shippers of the right to cut their own rail shipments, which would affect the automotive industry in its manufacturing operations to a large extent.



Dominion Motors factory at Leaside, Toronto

Year's Financing Shows a Drop

Average Per New Car in Retail Group Affected Most

WASHINGTON, Feb. 12—Wholesale financing of automobiles, which amounted to a volume of $29,257,137 in December (preliminary figure) brought the volume in this category for the year 1931 up to $554,440,655 as compared with $660,978,901 for the year 1930, according to the Bureau of the Census report released today.

Total volume of retail financing for 1931 reached $950,329,535, compared with a volume of $1,201,341,267 for the year 1930. In the month of December the volume was $50,460,005 as compared with $65,915,372 for the previous December. Of the retail volume new cars accounted for $558,165,298 in 1931, compared with $730,417,562 in 1930. The latter figures represent an average coverage of $388 in 1931 and $567 in 1930 on new-car financing.

Export Ratio Drops

WASHINGTON, Feb. 11—The unfavorable economic conditions throughout the world in 1931 are reflected in our greatly reduced export trade in automotive products amounting to only $160,750,833, a decline of $137,-901,215 or 46 per cent as compared with the figure for the twelve months previous, according to the Automotive Division, Department of Commerce. The 1931 total was also considerably under the yearly average for the 10-year period 1922-1931, which was $312,580,754.

In spite of a 29 per cent drop in the output of passenger cars and trucks the export ratio to production was but 5.4 per cent as against 7.1 and 10.0 per cent respectively during 1930 and 1929.

Simpson Joins M.E.M.A.

NEW YORK, Feb. 11—Thomas M. Simpson, who has been, for the past 3½ years, credit manager, secretary, and assistant legal counsel of Continental Motors Corp., has accepted the managership of the Detroit office of the Motor and Equipment Manufacturers Association, the appointment to be effective Feb. 15.

Publications Received

Report of the Twenty-Fourth National Conference of Weights and Measures.—Miscellaneous Publication No. 129 of the Bureau of Standards. Copies obtainable from the Superintendent of Documents, Washington, D. C. at 50 cents each.

Index to A.S.T.M. Standards and Tentative Standards as of Sept., 1931—American Society for Testing Materials, 1315 Spruce St., Philadelphia, Pa.

Friction of Some Babbitt, Roller and Ball Bearings, by Edward R. Maurer, and L. E. A. Kelso. Engineering Experiment Station, the University of Wisconsin, Madison, Wis.

The Resistance to Wear of Carbon Steels, by Samuel J. Rosenberg, Bureau of Standards.—Superintendent of Documents, Washington, D. C.

Industrial Fellowships—Mellon Institute of Industrial Research of the University of Pittsburgh, Pittsburgh, Pa.

Dauerfestigkeit von Stahlen mit Walzhaut, ohne und mit Bohrung, von Niet und Schweissverbindungen (Endurance Limit of Steels with Rolling Skin Without and With Drill Holes, and of Riveted and Welded Joints), by Otto Graf. Published by VDI Verlag, Berlin NW-7, Germany. This is a report of research work carried out by the author on the subject indicated by the title.

Einfluss der Oberflachenbeschaffenheit auf den Spannungsverlauf und die Schwingungsfestigkeit (Influence of the Surface Condition on Tensile Strength and Fatigue Limit) by Dr-Ing. Eugen Armbruster. Published by VDI Verlag, Berlin NW-7, Germany.

Air Corps Technical Report No. 3496: Weight Estimate of Cantilever Monoplane Wings of Corrugated Aluminum Alloy Construction. Published by Government Printing Office, Washington, D. C.

Second Report of Liaison Committee on Aeronautics Radio Research. Government Printing Office, Washington, D. C.

The Use of Zinc Oxide in Determinations of Cobalt and Manganese, by James I. Hoffman, Bureau of Standards. Research Paper No. 380 of the Bureau of Standards. Can be obtained from the Superintendent of Documents, Washington, D. C., at 5 cents a copy.

The Relation of Torque to Tension of Thread-locking Devices, by H. L. Whittemore, G. W. Nusbaum and E. O. Seaquist. Research Paper No. 386 of the Bureau of Standards and obtainable from the Superintendent of Documents, Washington, D. C., at 30 cents a copy.

Symposium on Welding (held at the Pittsburgh regional meeting of the American Society for Testing Materials). Published by the American Society for Testing Materials, Philadelphia, Pa.

This publication contains eleven papers presented at the Pittsburgh meeting. A majority of the papers deal with various methods of inspecting and testing welded work, including stethoscopic examination, gamma-ray testing, magnetic testing and fatigue and impact testing of welded products. One paper deals with tests of welding at the Watertown Arsenal and another with the general subject of welding inspection, the latter being by an engineer of the Westinghouse Electric & Mfg. Co.

Kerbwirkung an Biegestaben (Effects of Notches on Rods Under Bending Stress). By Dr.-Ing. Georg Fischer. Published by VDI Verlag, Berlin W-7, Germany.

This is a report on a research relating to tests on notched bars which are elastically deformed by a pure bending moment. The particular points investigated were the changes in form and in stresses in the region near the bottom of the notch when the notch dimensions are changed in accordance with certain rules.

English-French Comprehensive Technical Dictionary of the Automobile and Allied Industries. By Lewis L. Sell, Ph.D. Published by the International Dictionary Co., 15 Park Row, New York, N. Y. $6.00.

The Automotive Industry. Volume 1 in the Gregg Vocational Dictation Series for Stenographers. By Dora H. Pitts. Clyde Insley Blanchard, editor-in-chief. Published by the Gregg Publishing Co., New York, etc.

Locomobile Plant Sold

BUFFALO, Feb. 9—Buffalo financial interests, in association with New York investors, today acquired at a receiver's sale the $1,000,000 plant of the Locomobile Co. of America at Bridgeport, Conn., at a figure reported as $200,000.

The purchasing group included Fred B. Corey, chairman of the executive committee of the Buffalo, Niagara & Eastern Power Corp., Buffalo; William A. Strong, New York City, vice-president of the Marine Trust Co. of Buffalo; E. H. Havens and H. F. Herberman. The two last mentioned have been associated with the Locomobile company, and represented a protective committee of security holders.

Buick Position Gains

DETROIT, Feb. 8—C. W. Churchill, vice-president in charge of sales, Buick Motor Co., Flint, has announced that from October to the end of December, Buick made a gain of slightly more than 20 per cent among all eight-cylinder cars in Buick's price range.

Ross Reports Profit

NEW YORK, Feb. 3—Ross Gear & Tool Co. reports net profit for 1931 of $246,422. This is equivalent to $1.64 a share, and compares with earnings of $336,461, or $2.24 a share in 1930.

Budd Mfg. Reports Loss

NEW YORK, Feb. 3—Edward G. Budd Mfg. Co. reports net loss for the year 1931 of $730,412, as compared with a profit of $20,692 for the previous year.

+ + CALENDAR OF COMING EVENTS + +

SHOWS

Plainfield, N. J., Automobile.....Feb. 6-13
St. Paul, Minn., Automobile ....Feb. 6-13
St. Louis, Automobile.....Feb. 7-13
Denver, Colo., Automobile.....Feb. 8-13
Indianapolis, Ind., Automobile..Feb. 13-19
Salon, Los Angeles, Calif.....Feb. 13-20
Kansas City, Automobile.....Feb. 13-20
Mankato, Minn., Automobile...Feb. 17-20
Peoria, Ill., Automobile.....Feb. 17-21
Holyoke, Mass., Automobile...Feb. 18-22
Des Moines, Iowa, Automobile..Feb. 21-26
Wichita, Kan., Tractor and Power Equipment .....Feb. 23-26
Salon, San Francisco, Calif..Feb. 27-Mar. 5
Albany, N. Y., Automobile..Feb. 27-Mar. 5
Berne, Switzerland, Automobile.Mar. 11-20
National Aircraft, Detroit, Mich..Apr. 2-10

FOREIGN SHOWS

Copenhagen, Automobile ..Feb. 26-Mar. 6
Lyons, France, Passenger and Commercial .....Mar. 7-20
Geneva, Switzerland, Passenger and Commercial .....Mar. 11-20
Vienna, Passenger and Commercial .....Mar. 13-20
Tel Aviv, Palestine (Levant Fair) .....April 7-30
Milan, International Automobile Salon .....April 12-27
Zagreb, Jugoslavia, Automobile Salon .....April 23-May 2
Peznan, Poland, International Fair .....May 1- 8
Dublin, Commercial .....May 4- 7
Budapest, International Fair...May 7-16
Belfast, Commercial .....May 25-28
Bordeaux, Fair .....June
Cork, Commercial .....June
Inverness, Commercial .....June 21-24
Southampton, Commercial .....July 5- 9
Llandrindod, Wales, Commercial .....July 20-22
London, Olympia Show .....Oct. 13-22
Glasgow, Scottish Motor Show..Nov. 11-19

CONVENTIONS

American Institute Mining & Met. Engineers, Meeting, New York City, Feb. 15-19
Southern Automotive Jobbers Asso., Atlanta, Ga. .....Mar. 16-19
U. S. Chamber of Commerce, San Francisco, Calif.....May 16-20
National Battery Mfrs. Asso., Chicago, Ill. .....May 19-20
American Welding Society, Annual Meeting, New York City.....Apr. 27-29

A BETTER PRODUCT

Need Not be More Costly and Lower Costs Are Largely a Matter of Improved Production Methods

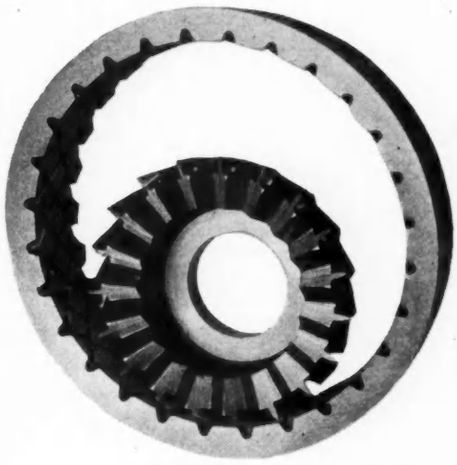
"Easy-shift," synchro-mesh transmissions, so common in 1932 automobiles, presented considerable manufacturing problems. Closer manufacturing limits were essential, and costs had to be kept down to meet competitive price declines.

The Gear Shaper was used to solve more than one perplexing problem in manufacturing parts for these improved designs. The friction clutch collar shown is one concrete example.

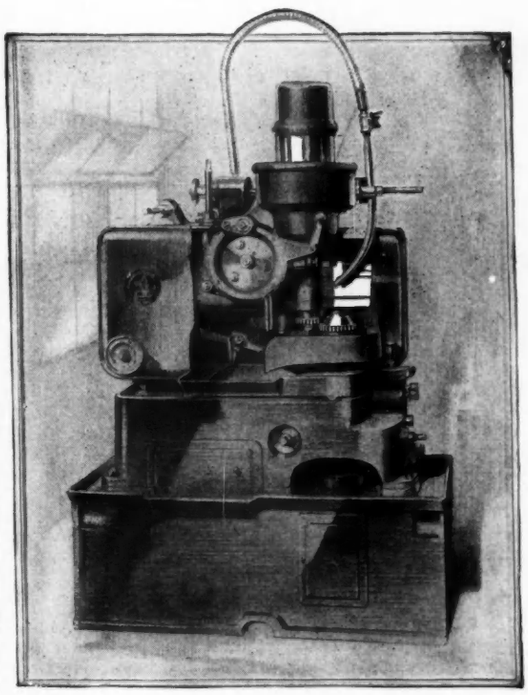
This part has cross-helical grooves cut on an internal-tapered surface. It was no problem at all on the High Speed Gear Shaper — in fact, simplicity itself.

All that was necessary was to equip a standard machine with tapered raising blocks between bed and base, use helical guides and cutters, and the problem was solved.

There is no need for you to worry over those perplexing problems—we stand ready to help you without any obligation. Write: THE FELLOWS GEAR SHAPER COMPANY, 78 River Street, Springfield, Vermont (616 Fisher Building, Detroit, Michigan).



A Friction Clutch Collar for a synchro-mesh transmission, machined at low cost on the High Speed Gear Shaper.



The versatility of the High Speed Fellows Gear Shaper is one of its cardinal advantages.

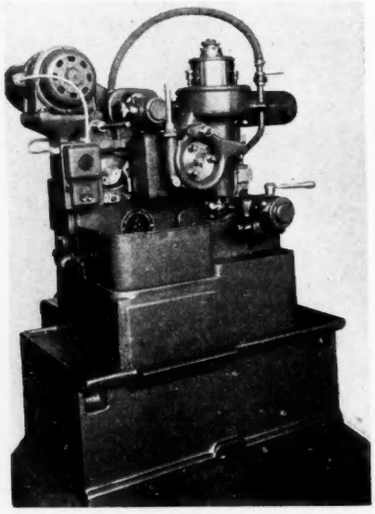
FELLOWS
GEAR SHAPERS

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Fellows Worm-Type Thread Generator

The Fellows Gear Shaper Company, Springfield, Vermont, has recently placed on the market a Thread Generating Machine, particularly adapted to the cutting of so-called hourglass-type worms. This is the type of worm at present applied extensively in steering gears for automotive use. The mating helical tooth segment can be generated on the high-speed gear shaper. This machine provides a rapid



means of cutting this type of worm. As an illustration, a single-thread hourglass worm of 4.268 D.P., using a 13-tooth, 3.046 in. P.D. cutter, can be completed in two minutes or less, floor to floor, the actual cutting time being 45 seconds for roughing and the same time for finishing.

An outstanding feature aside from high production possibilities is the side-trimming mechanism. This provides positive control over thread proportions, in that with work and cutter set at standard center distance, the cutter can be oscillated the required amount each side of its "central position," to cut the thread to the desired proportions.

On hourglass worms it is essential, if the best results are required, to take two cuts—roughing and finishing, using one machine for roughing and the other for finishing. The cutter-spindle is made adjustable for height so that the lower face of the cutter can be set in the correct relation to the axis of the work.

The amount of side trim can also be varied by adjusting the "throw" of the cam through a micrometer collar graduated in 0.001 in.

The work always rotates in a clockwise direction, but provision is made through a sliding sleeve and spiral bevel gears to change the direction of rotation of the cutter for cutting right and left-hand threads.

Power is applied through a 3 hp. constant-speed motor. The machine is provided with an electric push button which automatically stops the machine when the work has been finished.

Mineral Coated Welding Electrodes

A line of arc-welding electrodes with a heavy all-mineral flux coating, has been placed on the market by the Metal & Thermit Corp., acting as exclusive sales agents for the American Murex Corp. (the manufacturers). Both companies have offices at 120 Broadway, New York, N. Y.

The new electrodes, known as Murex, are made 18 in. long and in types and sizes suitable for a wide range of operations.

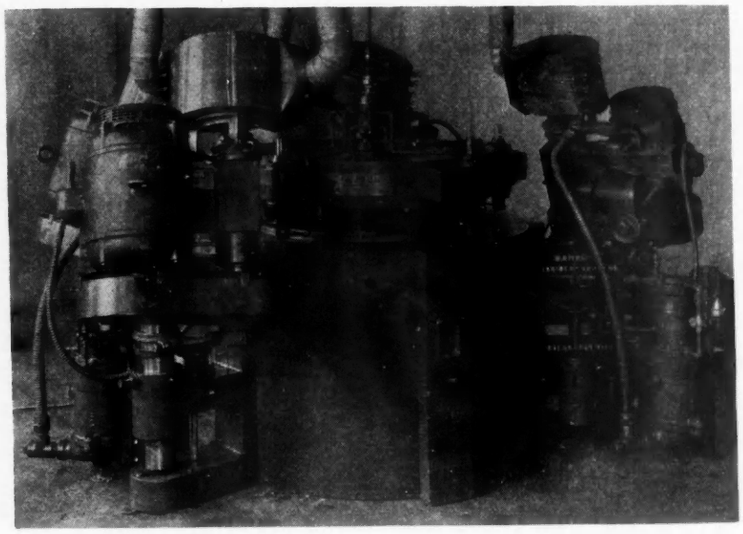
A feature of the electrode is a patented spiral winding of asbestos yarn which serves to hold the heavy mineral flux to the core so that it is not injured if the electrode is bent. The manufacturers point out that the all-mineral ingredients of the flux causes it to burn without objectionable fumes or smoke, while the thickness of the coating enables the operator to ride the electrode on the work.

Among the eight types are electrodes for welding commercial mild steel, manganese steel, 18-8 stainless, and stainless iron.

(Turn to page 246, please)

Hammond Polishing and Buffing Machine

A fully automatic, universal machine for polishing and buffing round, flat, or beveled work has been developed by the Hammond Machinery Builders, Inc., Kalamazoo, Mich. The four-



spindle size of this rotary machine is illustrated but it is also available in six and seven-spindle models.

Polishing and buffing heads are complete motor-driven units. They are multi-V belt driven and can be varied in speed either through sheaves or equipped with the Hammond Variable Speed V-pulley (patent pending) which permits increase to any speed up to 50% of the low speed. The spindles have a self-contained oscillating feature which may be thrown in or out by a lever on outside of housing.

The work table is mounted on anti-friction bearings, is dust-proof and is indexed by a Geneva motion. The machine is equipped throughout with anti-friction bearings and the entire base is dust-proof. Safety start and stop buttons are furnished for each individual head, as well as a master switch at the operator's station.

These machines are supplied with an automatic composition paste feeder which was described in *Automotive Industries* Sept. 19, 1931.

SMART FABRICS SELL CARS

ENGINEERING
may be a million dollar mystery
but
everybody can see the upholstery

THOUSANDS of cars are sold to people who don't know a helical gear from a butterfly valve.

But everyone with eyes to see forms an impression from the car interior. And a good or bad impression may involve no difference in upholstery cost.

American Woolen is doing some remarkable things in new style and new colors with that most stylish of upholsteries—the flat fabric.

Cool, fresh, trim, long-wearing broadcloths and Bedford cords of moderate price come from our looms in millions of yards.

We now sell direct to the motor car producer. Let us describe the advantages you can secure. Our Detroit office is conveniently at your command. A skilled technical staff is in attendance.

American Woolen Company
INCORPORATED
7-244 GENERAL MOTORS BUILDING - DETROIT
225 FOURTH AVENUE - - NEW YORK CITY

FLAT MOTOR CAR FABRICS

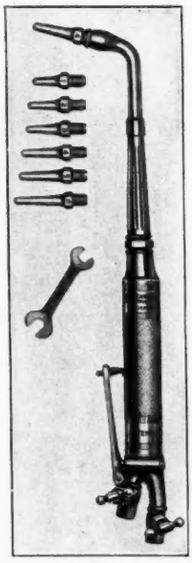
THE GREATEST NAME IN WOOLENS

NEW DEVELOPMENTS

Automotive Parts, Accessories and Production Tools

Torchweld Welding Torches

The Torchweld Equipment Co., Chicago, Ill., makers of a complete line of gas welding and cutting equipment has recently added two welding torches particularly suited to automotive needs.



The first is a No. 21NF automatic welding torch which comes in six sizes from 12 to 24 in. in length. It is automatic and is used in production welding of automobiles. Besides the automatic feature, these torches operate on equal or balanced pressure of gases from the cylinders and carry a neutral flame when the torch is in operation. These torches are approved by the Underwriters' Laboratories.

The second is a No. 41NF welding torch. This is used for small parts and body welding and operates on an equal pressure of gases. Two different sizes of tips can be used for both light and medium welding with a neutral, soft welding flame that makes sound welds that neither oxidize nor carbonize, according to the makers.

Bohnalite Cylinder Heads

An aluminum-alloy (Bohnalite) cylinder head has been produced by the Bohn Aluminum & Brass Corp. of Detroit.

Bohnalite cylinder heads are built in two types—the single-unit head and the composite head. The single-unit head is made entirely of Bohnalite, the combustion chamber side being made as a permanent mold casting, to assure a denser metal and more nearly uniform combustion chambers. The upper part of the head, which must be cored for water circulation, is made as a sand casting, the two processes being combined in one mold.

The composite head is made up of two castings, the lower half containing the combustion chamber being made of Bohnalite in a permanent mold, and the upper half as an ordinary gray iron casting. Cylinder heads of both types are said to permit the use of compression ratios higher than are possible with the usual iron cylinder heads, resulting in an increased power output. This increase in power is ordinarily associated with a reduction in fuel consumption. Another advantage of these cylinder heads is better cooling of the spark plugs, with resultant longer life and better operation.

Bohnalite cylinder heads weigh only about 40 per cent as much as the cast iron cylinder heads which they replace. The new type of cylinder head is already in use in the new Graham series of sixes and eights.

New Solid Shank Expansion Reamer

A new solid shank expansion reamer has been developed by The O. K. Tool Co., Shelton, Conn., to serve as an adjustable sizing reamer for finishing operations. The tool combines O. K. high speed steel cutter blades with a drop forged chrome nickel steel body. The blades are locked by a conical wedging screw, spreading the split body against the blade. The thrust of the nut is taken up by the adjusting nuts. Each reamer has a practical range of adjustment. The blades are set at negative spiral and irregularly spaced for fine finishing work.

P-O-L Primer

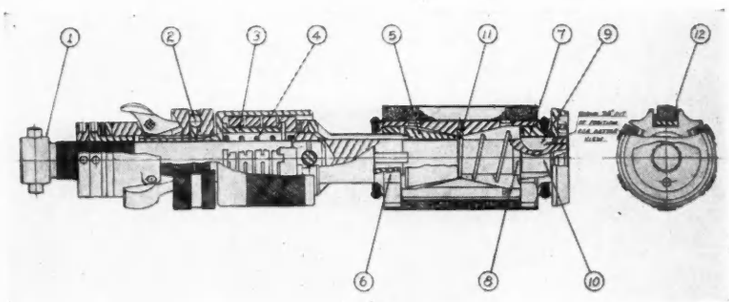
Among the exhibits of the Linde Air Products Co. of New York at the Road Show in Detroit is a device designed to assist in starting gasoline engines. The P-O-L primer introduces acetylene gas into the cylinders of the engine to facilitate starting. It consists of a stem-type brass primer valve, a Prest-O-Lite pressure regulator and 10 ft. of ¼-in. brass tubing with compression unions. The primer valve is mounted on the intake manifold of the engine and operated by a pull wire which leads from the valve lever through the dash if the vehicle has a self-starter, or through the radiator if hand cranking is employed.

Marbleized Fabrikoid

Marbleized effects on Fabrikoid are recent developments of the Fabrikoid Division of E. I. du Pont de Nemours & Co. These are in keeping with the vogue of marbleized effects in other branches of industry and are indicative of the various treatments to which Fabrikoid may be subjected. The material is in a number of color combinations, some printed in one color and some in two colors. Others are printed in one color with a Spanish finish. The fabrics are expected to be popular in the automobile and several other fields.

New Improved 3 Finger Automatic Micromatic Hone

Improvements in the Model 1A-O-F Three Finger Automatic Micromatic Hone placed on the market by the Micromatic Hone Corp., Detroit, Mich., include the adoption of soft steel, folded edge stone shells, which are said to add approximately 40 per cent to stone wear, correct uneven stone wear and eliminate possibility of cylinder wall scoring.



Twelve important improvements have been made to further increase the efficiency of our production hones for fast multiple spindle operation. These include: a drive ball solid on driveshaft to increase strength; carburized, hardened and ground wearing surfaces; the addition of a recoil spring to insure quicker and more positive collapse; wider bearings on bodies and flanges for better fit and easier assembly, and several other features of equal importance.

It is said that these improvements in no way change the basic principles of design and construction which are a feature of high production micromatic hones.